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NATIONAL AQUACULTURE ORGANIC ACT OF 1978,

95-2

HEARINGS

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

UNITED STATES SENATE

NINETY-FIFTH CONGRESS

SECOND SESSION

ON

S. 2582, S. 2762, and H.R. 9370

TO PROVIDE FOR THE DEVELOPMENT OF AQUACULTURE IN THE UNITED STATES, AND FOR OTHER PURPOSES

APRIL 17 AND 19, 1978

Part 1

Serial No. 95-81

Printed for the use of the
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NATIONAL AQUACULTURE ORGANIC ACT OF 1978

MONDAY, APRIL 17, 1978

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, D.C.

The committee met, pursuant to notice, at 10:10 a.m. in room 235, Russell Senate Office Building, Hon. Warren G. Magnuson presiding.

OPENING STATEMENT BY SENATOR MAGNUSON

Senator MAGNUSON. The committee will come to order.

This morning we're going to receive testimony on three bills. There may be one or two more that are not listed. One is a House bill, H.R. 9370; and the other two are Senate bills, S. 2582 and S. 2762. These bills provide for the development of aquaculture in the United States. These bills all have some similar objectives. They set forth national aquacultural policies, require the establishment of a national aquacultural development plan, establish mechanisms for interagency coordination, provide funding for research and development, and provide economic incentives for private aquaculturists in the form of loan guarantees, disaster loans, insurance, et cetera.

We will receive testimony this morning from Senators Weicker and Gravel, who have each introduced aquaculture bills, and Congressmen Murphy, Breaux, Leggett, and Forsythe, who are largely responsible for the passage of an aquaculture bill in the House. In addition, we will be receiving testimony from the Departments of Commerce, Agriculture, and Interior.

Since we have so many witnesses to hear from this morning, I would appreciate it if all the witnesses would summarize their statements and submit their full statements for the record.

[The bills and agency comments follow:]

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95TH CONGRESS
2D SESSION

S. 2582

IN THE SENATE OF THE UNITED STATES

FEBRUARY 24 (legislative day, FEBRUARY 6), 1978

Mr. WEICKER introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

A BILL

To provide for the development of aquaculture in the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Aquaculture Organic Act of 1978".

SEC. 2. FINDINGS, PURPOSE, AND POLICY.

(a) The Congress finds the following:

(1) The world consumption of seafood is increasing and the harvest of some populations of fish and shellfish has exceeded levels of maximum sustainable yield.

(2) Certain stocks of fish and shellfish of importance to the United States are depleted, or are declining, and

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such depletion or decline has an undesirable impact on both commercial and recreational fisheries.

(3) There is an extensive market for seafood in the United States, but the United States imports in excess of 50 percent of its fish and shellfish for human consumption (which imports are 10 times the level of exports), and this dependence on imports as a source of protein makes it difficult to insure continuous supplies and suggests that alternatives such as aquaculture be developed.

(4) Many segments of the world population are now facing serious nutritional deficiencies and food shortages due to adverse climatic conditions and the steady growth of population. These problems will become more severe, and the resulting demand for increased food production will have to be met chiefly through the application of scientific and technological advances from research on aquaculture and other food production systems.

(5) Aquaculture is contributing significantly to world food supplies with production equal to 10 percent of current landings of seafoods and has the potential for increase by a factor of five before the end of this century.

(6) Less than 3 percent of current United States fisheries production results from aquaculture but there is

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a good potential for expanding production from aquaculture to equal or exceed the worldwide average, thereby helping to provide United States consumers with stable supplies of high quality aquatic foods.

(7) The stocking of advanced life stages of fish and shellfish produced by aquaculture to the natural environment is a possible means of rebuilding and augmenting fish and shellfish populations and establishing new fisheries.

(8) The application of aquaculture technology offers opportunities for recovery of thermal energy, nutrients, and other resources normally wasted and may be a more efficient use of these resources for food production than current methods of agriculture.

(9) Water, whether fresh, brackish, or marine, which is suitable for aquaculture is diminishing or in many cases is underutilized.

(10) Where land-use and water-use management policies may inhibit the development of aquaculture facilities in areas suitable for aquaculture, consideration should be given to the utilization of these areas for aquaculture along with the other uses of such areas.

(11) Current efforts to develop aquaculture in the United States are highly diffuse, and a strong commitment by the Federal Government will make aquaculture

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more efficient and competitive, thereby stimulating public and private investment and development.

(12) While many scientific and technological problems are unsolved, there is sufficient knowledge to further the development of aquaculture production systems for some species of fish and shellfish.

(13) The development of aquaculture in the United States has been limited by the inability of producers of aquatic species to obtain adequate capital and a reliable source of seed stock.

(14) Aquaculture in the United States has traditionally concentrated on a few aquatic species, but many others have a potential for commercial and other culture.

(15) Government programs that help to reduce the risks associated with production of agricultural commodities have not been generally available to producers of those aquatic species in which the risk is high.

(b) The purpose of this Act is to promote aquaculture in the United States by—

(1) declaring a national aquaculture policy;

(2) establishing and implementing a national plan for aquaculture; and

(3) developing programs and encouraging activities;

which will result in the coordination of domestic aquaculture

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efforts, the conservation and increased availability of fisheries resources, the creation of new industries and job opportunities, and other national benefits.

(c) Aquaculture has a high potential for augmenting existing commercial and sport fisheries, thereby increasing the supply of aquatic protein for both human and animal consumption and assisting the United States in meeting its future food needs and contributing to the solution of world food problems. It is, therefore, in the national interest, and it is the national policy, to encourage the development of aquaculture.

SEC. 3. DEFINITIONS.

As used in this Act:

(1) The term "aquaculture" means the propagation and rearing of aquatic species in controlled or selected environments, including ocean ranching.

(2) The term "aquaculture facility" means any dry or submerged land, floating or fixed structure, or other appurtenance, if such land, structure, and appurtenance is located within the United States, which is used for aquaculture, including, but not limited to, any laboratory, hatchery, rearing pond, raceway, pen, incubator, or other equipment, including vessels in support of aquaculture.

(3) The term "aquatic species" means any species,

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native or introduced, of finfish, mollusk or crustacean or other aquatic invertebrate, amphibian, reptile, or aquatic plant, but does not mean any species of finfish or aquatic plant primarily used for ornamental purposes.

(4) The term "fund" means the Federal Aquaculture Assistance Fund established by section 11.

(5) The term "person" means any individual who is a citizen or national of the United States and any corporation, partnership, association, or other entity (including, but not limited to, any community development corporation or fishermen's cooperative) organized or existing under the laws of any State.

(6) The term "Secretary" means the Secretary of Commerce.

(7) The term "State" means any of the several States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the Virgin Islands, Guam, the Trust Territory of the Pacific Islands, and any other Commonwealth, territory, or possession of the United States.

(8) The term "United States", when used in a geographical context, means all States including the adjacent fisheries economic zone.

SEC. 4. NATIONAL AQUACULTURE DEVELOPMENT PLAN.

(a) (1) Before the close of the 1-year period beginning

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on the effective date of this Act, the Secretary shall by regulation establish a National Aquaculture Development Plan (hereinafter in this Act referred to as the "plan"). The Secretary shall give interested persons an opportunity to participate in the rulemaking in accordance with the provisions of section 553 of title 5, United States Code.

(2) (A) If the Secretary deems it appropriate, the Secretary may establish and appoint members of an advisory committee to assist in the initial development of the plan. Persons appointed to the committee shall be knowledgeable or experienced in the principles or practices of aquaculture and or other disciplines directly applicable to aquaculture.

(B) If an advisory committee is established under subparagraph (A), the members of the committee, while away from their homes or regular places of business in the performance of services for the committee, shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed expenses under section 5703 of title 5 of the United States Code.

(b) The plan shall—

(1) identify those aquatic species (hereinafter referred to in this Act as "priority aquatic species") which the Secretary determines to have a potential for culturing on a commercial or other basis, which deter-

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mination shall be made by the Secretary after taking into account—

(A) the extent of commercial aquaculture, if any, currently being carried out with respect to such species, and the projected biological and economic feasibility of culturing such species;

(B) the extent to which aquaculture research and development have been undertaken, within the public and private sectors, with respect to such species;

(C) the time and resources which will be required to develop aquaculture technology to the point where such species can be cultured on a commercial or other basis;

(D) such other factors as the Secretary determines to be appropriate; and

(2) contain an aquaculture development program, prepared by the Secretary for each priority aquatic species.

(c) The aquaculture development program contained in the plan for each priority aquatic species shall set forth those actions which the Secretary determies should be undertaken, and the period of time within which each such action should be completed, to provide for the culture of each such species

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on a commercial or other basis. Such actions, with respect to each priority aquatic species, shall include—

(1) such research and development, technical assistance, demonstration, extension education, and training as may be necessary and appropriate regarding—

(A) aquaculture facility design and operation,

(B) water quality management,

(C) utilization of waste products (including thermal effluents),

(D) nutrition and the development of economical feeds,

(E) life history, behavior, genetics, physiology, and pathology and disease control (including research regarding organisms which may not be harmful to fish and shellfish but are injurious to humans),

(F) life history, behavior, genetics, physiology and pathology and disease control of organisms designated as potential food sources for aquaculture species,

(G) processing and market development, and

(H) production management and quality control;

(2) research with respect to the effect of the cul-

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ture of such species on estuarine and other water areas, including the effects on the natural flora and fauna;

(3) the identification and analysis of any legal or regulatory constraints which may affect the culture of such species;

(4) the development of adequate supplies of seed stock;

(5) the construction, purchase, lease, or acquisition of necessary developmental aquaculture facilities; and

(6) Such other actions relating to research and development, technical assistance, demonstration, extension education, and training as the Secretary deems necessary and appropriate.

(d) In preparing an aquaculture development program for any priority aquatic species, and in reviewing any such program pursuant to subsection (f), the Secretary shall, to the extent practicable, take into account any significant action which has been, or which is proposed to be undertaken by any other Federal agency, any State agency, or any person, and which may affect the accomplishment of the program.

(e) Each action under each aquaculture development program prepared under this section for a priority aquatic species shall be implemented, by the Secretary, on the basis of—

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(1) responsibilities vested in the Secretary by law or any executive action having the effect of law (including, but not limited to, Reorganization Plan Numbered 4 of 1970); and

(2) in cases where paragraph (1) does not apply, the experience, expertise, and other appropriate resources which the department, over which the Secretary has jurisdiction, may have with respect to the action required under the program.

(f) (1) The Secretary, and any Federal or State agency which has significant functions which relate to aquaculture, shall review on an annual basis—

(A) each aquatic species not identified as a priority aquatic species; and

(B) the aquaculture development program established under the plan for each priority aquatic species to determine whether the actions specified in the program are being accomplished on a successful and timely basis.

(2) If as a result of the review conducted pursuant to paragraph (1) (A), the Secretary determines, after taking into account the criteria set forth in subsection (b) (1), that any aquatic species has a potential for culturing on a commercial or other basis the Secretary shall by regulation amend the plan to identify such species as a priority aquatic

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species and prepare an aquaculture development program for such species pursuant to subsection (c).

(3) If as a result of the review conducted pursuant to paragraph (1) (B), the Secretary finds that—

(A) any action so specified should be revised, the Secretary shall make such revision to the program as he deems necessary and appropriate; or

(B) sufficient progress is not being made with respect to any such program or that actions taken under any such program indicate that culture of the priority aquatic species concerned is doubtful, the Secretary shall cancel the program.

The Secretary shall by regulation amend the plan whenever any revision or cancellation is made pursuant to this subsection.

SEC. 5. FUNCTIONS AND POWERS.

(a) In implementing the aquaculture development program prepared under section 4 for any priority aquatic species, the Secretary shall—

(1) provide advisory, educational, and technical assistance (including training) with respect to culture of the species to interested public and private organizations and individuals, but in providing such assistance, shall, to the maximum extent practicable, avoid dupli-

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cation of like assistance provided by other Federal agencies;

(2) consult and cooperate with interested persons, Federal, State, and local government agencies, regional commissions, and educational institutions regarding the development of aquaculture technology;

(3) produce, under the authority of section 4(c)(4), and sell at cost seed stock for the priority aquatic species when privately produced seed stock is unavailable, unreliable, or not sufficient to meet production needs; and

(4) prescribe such regulations as may be necessary to carry out such program.

(b) The Secretary may, incident to such Secretary's implementation of any aquaculture development program—

(1) for the purposes of assessing the biological and economic feasibility of any aquaculture system—

(A) conduct scale tests of the system, and, if necessary for the conduct of any such test, construct, operate, and maintain developmental aquaculture facilities, including, but not limited to, pilot plants for testing laboratory-results; and

(B) conduct such other tests or analyses as may be necessary;

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(2) develop methods to enhance aquatic species stocks by aquaculture;

(3) carry out such studies and research with respect to aquatic species as may be appropriate regardless of whether such species is or has been identified as a priority species; and

(4) take such other actions as the Secretary deems necessary and appropriate.

(c) In addition to carrying out such other functions as are required under this Act, the Secretary shall—

(1) establish and maintain an aquaculture information center which shall function as a national clearinghouse for the collection, selection, analysis, and dissemination of scientific, technical, legal, and economic information relating to aquaculture;

(2) conduct appropriate surveys, in coordination with other agencies, of public and private aquaculture being carried out in the United States with respect to each aquatic species for the purpose of acquiring information on acreages, water use, production, culture techniques, and other relevant matters;

(3) arrange for the mutual exchange of information relating to aquaculture with foreign nations; and

(4) conduct a continuing study to determine which existing capture fisheries could be adversely impacted in

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the marketplace by competition from products produced by commercial aquaculture enterprises significantly aided under this Act, which study shall include an assessment of economic impact by species and by geographical region, and recommended measures to ameliorate any adverse impact. The Secretary shall report to Congress on the findings made under such study no later than 2 years following the effective date of this Act and every 2 years thereafter.

Any production information submitted to the Secretary by any person under paragraph (2) shall be confidential and shall not be disclosed except to the Secretary for purposes of carrying out this Act, the advisory committee which may be established under section 4 (a) (2) (A), or when required under court order. The Secretary shall by regulation prescribe such procedures as may be necessary to preserve such confidentiality, except that the Secretary may release or make public any such information in any aggregate or summary form which does not directly or indirectly disclose the identity or business of any person who submits such information.

(d) (1) The Secretary is authorized to accept any gift, temporary donation, or devise or bequest of real or personal property, or the proceeds therefrom, or interests therein, for use in carrying out any function that such Secretary may

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have under this Act. Any such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude, if such terms are deemed by the Secretary concerned to be in accordance with law and compatible with the purpose for which acceptance is sought.

(2) Any gift or bequest of money, and any proceeds from the sale of other property received in a separate account under this subsection, shall be deposited in a separate account in the Treasury and shall be disbursed upon the order of the Secretary.

SEC. 6. COORDINATION OF FEDERAL AGENCY ACTIVITIES REGARDING AQUACULTURE.

(a) (1) There is established the Interagency Committee on Aquaculture (hereinafter in this section referred to as the "Committee") which shall be composed of the following officers or their designees:

(A) The Secretary, who shall be the Chairman of the Committee.

(B) The Secretary of the Interior.

(C) The Secretary of Agriculture.

(D) The Administrator of the Environmental Protection Agency.

(E) The Administrator of the Energy Research and Development Administration.

(F) The Commissioner of Food and Drugs.

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(G) The Administrator of the Small Business Administration.

(H) The Chief of Engineers.

(I) The chief executive officer of any other Federal agency and any Regional Fishery Management Council which the Secretary finds to have significant functions which relate, or may relate, to the development of aquaculture.

(2) The functions of the Committee shall be—

(A) to insure that there is a continuing exchange of information among the agencies represented on the Committee with respect to the nature and status of the programs or projects being carried out by such agencies which relate, or which may relate, to aquaculture in general or to the implementation of the plan; and

(B) to review on a continuing basis, for purposes of exchange of information the relevant programs and projects of all Federal agencies to determine whether they are being carried out in compliance with subsection (b).

(b) Each Federal agency which has any function or responsibility with respect to aquaculture or has jurisdiction over any activity which affects, or may affect, the achievement of the purposes of this Act, shall, in consultation with the Secretary and to the maximum extent practicable, carry

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out such function, responsibility, and activity in a manner which is consistent with the purposes of this Act.

(c) Nothing in this Act shall be construed to amend, repeal, or otherwise modify the authority of any Federal officer or any Federal agency to carry out any functions relating to aquaculture which are authorized under any other provision of law.

SEC. 7. CONTRACTS AND GRANTS.

(a) The Secretary may carry out any function under this Act, through grants to, or contracts with, any other Federal agency, any agency of any State and, subject to the approval of the State, any agency of any political subdivision thereof, any regional commission, any educational institution, or any other person.

(b) Any contract entered into, or any grant made, pursuant to this section shall contain such conditions and limitations as the Secretary concerned shall by regulation prescribe as being necessary and appropriate to protect the interests of the United States; except that no contract may be entered into, and no grant may be made, pursuant to this section unless the applicant submits with his application therefor a certification from each appropriate State agency and each appropriate local government agency stating that nothing in the laws administered by such agency prevents the carrying

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out of the project to which the contract or grant will be applied.

(c) The amount of any grant made pursuant to this section may not exceed one-half the estimated cost of the project for which the grant is made.

(d) Any person who receives a grant or contract under this section shall make available to the Secretary concerned and to the Comptroller General of the United States, or any of their authorized representatives, for purposes of audit and examination, any book, document, paper, and record that is pertinent to the funds received by such person under such grant of contract.

SEC. 8. GUARANTEES OF OBLIGATIONS ISSUED FOR AQUACULTURE FACILITIES.

(a) (1) The Secretary may, subject to the provisions of this section, guarantee, or make a commitment to guarantee, the payment of interest on, and the principal amount of, any obligation issued by an obligor for any of the following purposes:

(A) The financing of the construction, reconstruction, or reconditioning of any aquaculture facility (including the financing of the purchase cost of any aquaculture facility to be reconstructed or reconditioned); except that no obligation may be guaranteed under this

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section later than 2 years after the date of the completion of the construction, reconstruction, or reconditioning of the aquaculture facility involved.

(B) The acquisition of stocks of aquatic species in all stages of development necessary to initiate any aquaculture facility.

(C) The financing of the initial operating expenses of any aquaculture facility.

(D) The financing of marketing operations exclusively for aquaculture products.

(E) The refinancing of any existing obligation issued for any of the purposes specified in subparagraph (A), (B), (C), or (D), whether or not guaranteed under this section, including, but not limited to, any short-term obligation incurred for the purpose of obtaining temporary funds for refinancing.

(F) Guarantees and commitments to guarantee may be made under this section without regard to section 3679(a) of the Revised Statutes of the United States (31 U.S.C. 665(a)).

(2) The full faith and credit of the United States is pledged to the payment of all guarantees made under this section with respect to both principal and interest, including any interest, if provided for in the guarantee, which may

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accrue between the date of default under a guaranteed obligation and the payment in full of the guarantee.

(3) Any guarantee, or commitment to guarantee, made by the Secretary under this section shall be conclusive evidence of the eligibility of the obligation for such guarantee, and the validity of any guarantee, or commitment of guarantee, so made shall be incontestable.

(4) The aggregate unpaid principal amount of all obligations guaranteed under this section and outstanding at any one time shall not exceed $100,000,000.

(b) (1) Obligations guaranteed under this section—

(A) shall have an obligor approved by the Secretary as being responsible and possessing the ability, experience, financial resources, and other qualifications necessary for the adequate operation and maintenance of the aquaculture facilities;

(B) shall be in an aggregate principal amount which does not exceed 87½ percent of the actual cost involved or the depreciated actual cost, as determined by the Secretary;

(C) shall have maturity dates satisfactory to the Secretary, but not to exceed 25 years;

(D) shall provide for payments by the obligor satisfactory to the Secretary; and

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(E) shall bear interest (exclusive of charges for the guarantee and service charges, if any) at rates not to exceed such percentage per annum on the unpaid principal as the Secretary determines to be reasonable, taking into account the range of interest rates pravailing in the private market for similar loans and the risks assumed by the Secretary.

(2) In guaranteeing any obligation under this section, the Secretary shall give preference to any person with 40 or fewer employees which, together with its affiliates, is primarily engaged in the business of aquaculture or commercial fishing for aquatic species.

(3) No obligation shall be guaranteed under this section unless the obligor conveys or agrees to convey to the Secretary such security interest as the Secretary may require to reasonably protect the interests of the United States.

(c) (1) The Secretary may charge a fee for any obligation guaranteed under this section, the amount of which shall be established by the Secretary by regulation but which may not exceed one-half of 1 percent per annum of the outstanding principal balance of the obligation. Fee payments shall be made by the obligor to the Secretary when moneys are first advanced under a guaranteed obligation and at least 60 days before each anniversary date thereafter.

(2) The Secretary shall charge and collect from the

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obligor such amounts as he may deem reasonable for the investigation of the application for any guarantee, for the appraisal of properties offered as security for any guarantee, and for the inspection of such properties during construction, reconstruction, or reconditioning; except that such charges shall not aggregate more than one-half of 1 percent of the original principal amount of the obligation to be guaranteed.

(3) All fees and other amounts received by the Secretary under the provisions of this subsection shall be deposited in the fund.

(4) Obligations guaranteed under this section, and agreements relating thereto, shall contain such other provisions with respect to the protection of the security interests of the United States (including acceleration and subrogation provisions and the issuance of notes by the obligor to the Secretary), liens and releases of liens, payments of taxes, and such other matters as the Secretary may prescribe.

(d) (1) In the event of a default, which has continued for 30 days, in any payment by the obligor of principal or interest due under any obligation guaranteed under this section, the obligee or his agent shall have the right to demand, at or before the expiration of such period as may be specified in the guarantee or related agreements, but not later than 90 days from the date of such default, payment by the Secretary of the unpaid principal amount of said obliga-

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tion and of the unpaid interest thereon to the date of payment. Within such period as may be specified in the guarantee or related agreements, but not later than 30 days from the date of such demand, the Secretary shall promptly pay to the obligee or his agent the unpaid principal amount of the obligation and unpaid interest thereon to the date of payment; except that the Secretary shall not be required to make such payment if before the expiration of such period he finds that there was no default by the obligor in the payment of principal or interest or that such default has been remedied before any such demand.

(2) Payments required to be made by the Secretary under paragraph (1) shall be made by the Secretary from the fund.

(3) In the event of any payment by the Secretary under paragraph (1), the Secretary shall have all rights in any security held by him relating to his guarantee of such obligations as are conferred upon him under any security agreement with the obligor. Notwithstanding any other provision of law relating to the acquisition, handling, or disposal of property by the United States, the Secretary may, under such terms and conditions as the Secretary prescribes or approves, complete, recondition, reconstruct, renovate, repair, maintain, operate, or sell any property

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acquired by him pursuant to a security agreement with the obligor.

(4) After any default referred to in paragraph (1), the Secretary shall take such action against the obligor or any other parties liable thereunder that, in his discretion, may be required to protect the interests of the United States. Any suit may be brought in the name of the United States or in the name of the obligee and the obligee shall make available to the United States all records and evidence necessary to prosecute any such suit. The Secretary may accept a conveyance of title to and possession of property from the obligor or other parties liable to the Secretary and may purchase the property for an amount not greater than the unpaid principal amount of such obligation and interest thereon. In the event the Secretary receives through the sale of property an amount of cash in excess of any payment made to an obligee under paragraph (1) and the expenses of collection of such amounts, he shall pay such excess to the obligor.

(5) Whoever, for the purpose of obtaining any loan or advance of credit from any person with the intent that an obligation relating to such loan or advance of credit shall be offered to or accepted by the Secretary to be guaranteed, or for the purpose of obtaining any extension or renewal of any loan, advance of credit, or mortgage relating to an obligation guaranteed by the Secretary, or the acceptance, re-

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lease, or substitution of any security on such a loan, advance of credit, or for the purpose of influencing in any way the action of the Secretary under this section, makes, passes, utters, or publishes, or causes to be made, passed, uttered, or published any statement, knowing the same to be false, or alters, forges, or counterfeits, or causes or procures to be altered, forged, or counterfeited, any instrument, paper, or document, or utters, publishes, or passes as true, or causes to be uttered, published, or passed as true, any instrument, paper, or document, knowing it to have been altered, forged, or counterfeited, or willfully overvalues any security, asset, or income shall be punished by a fine of not more than $5,000, or by imprisonment for not more than 2 years, or both.

(e) The Secretary shall promulgate such rules and regulations as may be deemed necessary or appropriate to carry out the purposes and provisions of this section.

(f) For purposes of this section—

(1) The term "actual cost" of an aquaculture facility, as of any specified date, means the aggregate, as determined by the Secretary, of—

(A) all amounts paid by, or for the account of, the obligor with respect to such facility on or before that date; and

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(B) all amounts which the obligor is then obligated to pay from time to time thereafter, for the construction, reconstruction, or reconditioning of such facility.

(2) The terms "construction", "reconstruction", or "reconditioning" include, but are not limited to, designing, inspecting, outfitting, and equipping of the aquaculture facility involved.

(3) The term "depreciated actual cost" means the actual cost depreciated on a straightline basis over the useful life of the property involved as determined by the Secretary.

(4) The term "obligation" means any note, bond, debenture, or other evidence of indebtedness issued for one of the purposes specified in subsection (a).

(5) The term "obligee" means the holder of any obligation.

(6) The term "obligor" means any person primarily liable for payment of the principal of or interest on any obligation.

SEC. 9. INSURANCE AGAINST ESSENTIAL STOCK LOSSES INCURRED IN AQUACULTURE FACILITY OPERATIONS.

(a) As used in this section, unless the context otherwise requires—

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(1) The term "essential stock insurance" means insurance against loss of, or damage to, any aquatic species being cultured at an aquaculture facility due to unavoidable or natural causes, including, but not limited to, drought, pollution, hail, frost, wind, winterkill, freeze, lightning, fire, excessive rain, flood, snow, wildlife, hurricane, tornado, insect or parasite infestation, disease, and such other unavoidable or natural causes as the Secretary by regulation shall specify.

(2) The term "insurer" includes any insurance company or group of companies under common ownership which is authorized to engage in the insurance business under the laws of any State.

(3) The term "owner" means any person having an insurable interest in an aquaculture facility or aquatic species stock.

(4) The term "pool" means any pool or association of insurers in any State which is formed, associated, or otherwise created for the purpose of making insurance more readily available.

(5) The term "reasonable premium rate" means that premium rate determined by the Secretary, which would permit the purchase of any direct insurance coverage by a reasonably prudent person in similar cir-

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cumstances with due regard to the costs and benefits involved.

(b) The Secretary may by regulation define any technical or trade term necessary in the administration of this section, insofar as any such definition is not inconsistent with the provisions of this section.

(c) (1) The Secretary shall conduct, within 6 months after the effective date of this Act, and annually thereafter, a study to determine whether direct insurance for essential stock loss is generally available to owners at reasonable premium rates, through insurers, pools, or a suitable program adopted under State law.

(2) (A) If the Secretary finds, as a result of the study referred to in paragraph (1), that essential stock insurance is not available at reasonable premium rates in any State and that such insurance has not been provided by State action, the Secretary shall establish a program to provide such insurance in such State.

(B) Any essential stock insurance issued by the Secretary under this paragraph shall be subject to such terms and conditions and to such deductibles and other restrictions and limitations as the Secretary deems appropriate; except that the Secretary may not provide essential stock insurance with respect to any stock of aquatic species if the Secretary determines such stock to be uninsurable due to the failure

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of the owner to follow established principles for culturing aquatic species or due to the lack of reasonable protective measures at the aquaculture facility concerned to prevent the loss of, or damage to, the stock being cultured.

(d) (1) In determining the premium rate for any essential stock insurance offered from time to time under subsection (c) the Secretary shall consult with persons knowledgeable and experienced in insurance, including, but not limited to, State insurance regulatory authorities, and may take into consideration with respect to the insurance concerned, the nature and degree of risk involved, the protective devices employed, the extent of past and anticipated losses, the prevailing rate for similar coverages, the economic importance of the insurance, and the relative abilities of the particular classes and types of insureds to pay the actual premium for such coverage.

(2) (A) The Secretary may not establish the premium rate for essential stock insurance at less than 25 percent of the actual premium rate for such insurance.

(B) For purposes of subparagraph (A), the actual premium rate for essential stock insurance offered under this section shall be determined as follows:

(i) If insurance of the same kind is generally offered by insurers or pools in the State concerned, the actual premium rate shall be that rate which the Secre-

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tary determines to be the median premium rate for all such insurance so offered.

(ii) If insurance of the same kind is not generally offered by insurers or pools in the State concerned, the actual premium rate shall be that rate which the Secretary determines to be the rate at which insurers or pools in such State would offer such insurance, taking into account actuarially sound principles applicable to the elements making up such rate, including, but not limited to, claim losses, general administrative expenses, acquisition expenses, taxes, license fees, and profits.

In making determinations under clauses (i) and (ii), the Secretary shall consult with the insurance regulatory authority of the State concerned and any rate advisory organization licensed by such State.

(3) Nothing in this section shall be construed to prohibit or require either the adopting of uniform national rates or the periodic modification of the currently estimated reasonable premium rates for any particular coverage, class, State, or risk on the basis of additional information or actual loss experience.

(e) (1) The Secretary may enter into any contract, agreement, treaty, or other arrangement with any insurer or pool to provide reinsurance coverage with respect to essential stock insurance issued by such insurer or pool, in con-

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sideration of payment of such premiums, fees, or other charges by insurers or pools which the Secretary deems to be appropriate, after consultation with persons knowledgeable and experienced in insurance.

(2) Reinsurance issued under this subsection shall reimburse an insurer or pool for its total proved and approved claims for covered losses resulting from providing insurance concerned during the term of the reinsurance contract, agreement, treaty, or other arrangement, over and above the amount of the insurer's or pool's retention of such losses, as provided in such reinsurance, contract, agreement, treaty, or other arrangement entered into under this section.

(3) Such contracts, agreements, treaties, or other arrangements may be made without regard to section 3679 (a) of the Revised Statutes of the United States (31 U.S.C. 665 (a)), and shall include any terms and conditions which the Secretary deems necesary to carry out the purposes of this section. The premium rates and terms and conditions of such contracts, agreements, treaties, or other arrangements with an insurer or pool shall be uniform in any one year throughout the country.

(f) (1) All premiums received by the Secretary under this section shall be deposited into the fund.

(2) The Secretary, in a suit brought in the appropriate United States district court, shall be entitled to recover from

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any owner, insurer, or pool the amount of any unpaid premium lawfully payable to the Secretary by such owner, insurer, or pool under essential stock insurance or reinsurance issued under this section.

(3) No action or proceeding shall be brought for the recovery of any premium due the Secretary, or for the recovery of any premium paid to the Secretary in excess of the amount due, unless such action or proceeding is commenced within 5 years after the right accrued for which the claim is made; except that, if the insurer has made or filed with the Secretary a false or fraudulent statement or other document with intent to evade, in whole or in part, the payment of premiums, the claim shall not be deemed to have accrued until its discovery by the Secretary.

(g) In order to provide for maximum efficiency in the administration of the insurance and reinsurance program provided under this section, and in order to facilitate the expeditious payment of any claims under such program, the Secretary may enter into contracts with any insurer, pool, or person, for the purpose of providing for the performance of any of the following functions:

(1) The estimation or determination of any amounts of payments for reinsurance or essential stock insurance claims.

(2) The receipt, disbursement, and accounting for

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funds in making payments for reinsurance and direct insurance claims.

(3) The auditing of the records of any insurer, pool, or person to the extent necessary to assure that proper payments are made.

(4) The establishment of the basis of liability for reinsurance or essential stock insurance payments, including the total amount of proved and approved claims which may be payable to any insurer, pool, or owner, and the total amount of premiums earned by any insurer or pool in the respective States from essential stock insurance or reinsurance.

(5) The provision of assistance in any manner provided for in the contract to further the purposes of this section.

(h) The Secretary may, with the consent of the agency concerned, accept and utilize, on a reimbursable basis, the officers, employees, services, facilities, and information of any Federal agency with respect to any insurance matter which is within the purview of this section.

(i) The Secretary may prescribe regulations establishing the general method or methods by which proved and approved claims for losses are paid under essential stock insurance or reinsurance issued under this section. Proved and approved claims shall be paid from the fund.

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(j) The Secretary, in providing essential stock insurance or reinsurance under this section may adjust and pay all claims for proved and approved losses covered by such insurance and, upon the disallowance by the Secretary, or upon the refusal of the claimant to accept the amount allowed upon any such claim, the claimant, within one year after the date of mailing of notice of disallowance or partial disallowance of the claim, may institute an action on such claim against the Secretary in the United States district court for the district in which the insured owner or reinsured insurer or pool resides or principally conducts business, and jurisdiction is hereby conferred upon such court to hear and determine such action without regard to the amount in controversy.

(k) The face amount of essential stock insurance and reinsurance coverage outstanding and in force at any one time under this section shall not exceed $250,000,000.

(l) No essential stock insurance or reinsurance may be issued by the Secretary under this section after the close of the 5-year period beginning on the effective date of this Act.

SEC. 10. FEDERAL AQUACULTURE ASSISTANCE FUND.

(a) There is established in the Treasury of the United States a Federal Aquaculture Assistance Fund. The fund shall be available to the Secretary as a revolving fund for

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the purpose of carrying out, and administering, sections 8 and 9. The fund shall consist of—

(1) any sums appropriated to the fund;

(2) any fees received by the Secretary in connection with any guarantee made under section 8;

(3) recoveries and receipts received by the Secretary under security, subrogation, and other rights and authorities under sections 8 and 9;

(4) premiums paid to, or recovered by, the Secretary for any direct insurance or reinsurance issued by by the Secretary under section 9; and

(5) moneys deposited pursuant to the last sentence of subsection (b).

All payments made by the Secretary to carry out the provisions of sections 8 and 9 (including reimbursements to other Government accounts) shall be paid from the fund, only to the extent provided in appropriate Acts. Sums in the fund which are not currently needed for the purposes of sections 8 and 9 shall be kept on deposit or invested in obligations of, or guaranteed by, the United States.

(b) If at any time the moneys in the fund are not sufficient to pay any amount the Secretary is obligated to pay under section 8(d)(1) or any direct insurance or reinsurance claim under section 9, the Secretary shall issue to the Secretary of the Treasury notes or other obligations

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(only to such extent and in such amounts as may be
vided for in appropriation Acts) in such forms and deno
tions, bearing such maturities, and subject to such term
conditions as the Secretary of the Treasury prescribes.
notes or other obligations shall bear interest at a rate
mined by the Secretary of the Treasury, taking into
sideration the current average market yield on outsta
marketable obligations of the United States of comp
maturities during the month preceding the issuance of
notes or other obligations. The Secretary of the Tre
shall purchase any notes and other obligations to be
hereunder and for such purpose he may use as a
debt transaction the proceeds from the sale of any sec
issued under the Second Liberty Bond Act, as amende
the purposes for which securities may be issued under
Act, as amended, are extended to include any purcha
such notes and obligations. The Secretary of the Tre
at any time may sell any of the notes or other oblig
acquired by him under this subsection. All redemp
purchases, and sales by the Secretary of the Treasury o
notes or other obligations shall be treated as public
transactions of the United States. Moneys borrowed
this subject shall be deposited in the fund and re
tions of such notes and obligations shall be made b
Secretary from the fund.

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SEC. 11. REPORT AND RECOMMENDATIONS.

Before the close of the 90th day after the close of the 3-year period beginning on the effective date of this Act, the Secretary shall review the operation and effectiveness of the insurance program provided for under section 9 and shall submit a report thereon to the Congress, together with the recommendation of the Secretary as to whether or not such program should be continued and, if the Secretary recommends continuation, such suggestions as the Secretary may have for improving the operation and effectiveness of such program.

SEC. 12. AUTHORIZATION OF APPROPRIATIONS.

(a) For purposes of carrying out the provisions of this Act (other than section 8 or 9), there are authorized to be appropriated, notwithstanding any authorization for appropriations in any other Act in effect before the date of the enactment of this Act—

(1) to the Department of Commerce, not to exceed—

(A) $5,000,000 for the fiscal year 1979,

(B) $20,000,000 for the fiscal year 1980, and

(C) $25,000,000 for the fiscal year 1981.

(b) There are authorized to be appropriated, without fiscal year limitation, to the fund such sums as may be necessary and appropriate for purposes of carrying out sections 8

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and 9; but not to exceed $100,000,000 for the purposes of section 8 and not to exceed $250,000,000 for the purposes of section 9.

SEC. 13. EFFECTIVE DATE.

This Act shall take effect October 1, 1978.

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95TH CONGRESS
2D SESSION

S. 2762

IN THE SENATE OF THE UNITED STATES

MARCH 17 (legislative day, FEBRUARY 6), 1978

Mr. GRAVEL introduced the following bill; which was read twice and referred to the Committees on Agriculture, Nutrition, and Forestry and Commerce, Science, and Transportation jointly by unanimous consent

A BILL

To provide for the development of aquaculture in the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Aquaculture Organic Act of 1978".

SEC. 2. FINDINGS, PURPOSE, AND POLICY.

(a) The Congress finds the following:

(1) The world production of seafood has declined since 1970 and the harvest of some populations of fish and shellfish has exceeded levels of maximum sustainable yield.

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(2) Certain stocks of fish and shellfish of importance to the United States are depleted, or are declining, and such depletion or decline has an undesirable impact on both commercial and recreational fisheries.

(3) There is an extensive market for seafood in the United States, but the United States imports in excess of 50 percent of its fish and shellfish for human consumption (which imports are ten times the level of exports), and this dependence on imports as a source of protein makes it difficult to insure continuous supplies and suggests that alternatives such as aquaculture be developed.

(4) Many segments of the world population are now facing serious nutritional deficiencies and food shortages due to adverse climatic conditions and the steady growth of population. These problems will become more severe, and the resulting demand for increased food production will have to be met chiefly through the application of scientific and technological advances from research on aquaculture and other food production systems.

(5) Aquaculture is contributing significantly to world food supplies with production equal to 10 percent of current landings of seafoods and has the potential for increase by a factor of five before the end of this century.

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(6) Less than 3 percent of current United States fisheries production results from aquaculture but there is a good potential for expanding production from aquaculture to equal or exceed the worldwide average, thereby helping to provide United States consumers with stable supplies of high quality aquatic foods.

(7) Growth of aquatic plants is a source of food for human and animal consumption as well as a source of industrial materials and energy. The Congress recognizes the importance of developing aquaculture of both plant and animal species.

(8) The stocking of advanced life stages of fish and shellfish produced by aquaculture is a means of rebuilding and augmenting fish and shellfish populations and establishing new fisheries.

(9) The application of aquaculture technology offers opportunities for the recovery of wasted thermal energy, nutrients, and other resources and may be a more efficent use of these resources for food production than current methods of agriculture.

(10) Where water, whether fresh, brackish, or marine is suitable for aquaculture, appropriate consideration should be given to the utilization of such water for aquaculture along with the other uses of such water.

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(11) Where land-use management policies may inhibit the development of aquaculture facilities in areas suitable for aquaculture, appropriate consideration should be given to the utilization of these areas for aquaculture along with the other uses of such areas.

(12) Current efforts to develop aquaculture in the United States are highly diffuse, and a strong commitment by the Federal Government will make aquaculture more efficient and competitive, thereby stimulating public and private investment and development.

(13) While many scientific and technological problems are unsolved, there is sufficient knowledge to further the development of aquaculture production systems for many species of fish and shellfish.

(14) The development of aquaculture in the United States has been limited by the inability of producers of aquatic species to obtain adequate capital and a reliable source of seed stock.

(15) Aquaculture in the United States has traditionally concentrated on a few aquatic species, but many others have a potential for commercial and other culture. However, the culture of additional species may include a higher degree of risk than the culture of traditional species, especially during the initial stages.

(16) Government programs that help to reduce the

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risks associated with production of agricultural commodities have not been generally available to producers of those aquatic species in which the risk is high.

(17) The rehabilitation and enhancement of the publicly owned fish and shellfish resources are desirable applications of aquaculture technology as a means to increase the general public benefits to be derived from the utilization of these common property resources.

(18) Extensions of jurisdiction over marine resources by numerous nations have resulted in the exclusion of many fishing nations from traditional fishing areas and created a demand in those nations for aquatic foodstuffs. Aquaculture could supply this new demand.

(19) The Select Committee on Nutrition and Human Needs of the Senate has recommended an increase in the fish consumption of the American family. Aquaculture can help to carry out this recommendation.

(b) The purpose of this Act is to promote aquaculture in the United States by—

(1) declaring a national aquaculture policy;

(2) establishing and implementing a national plan for aquaculture; and

(3) developing programs and encouraging activities;

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which will result in the coordination of domestic aquaculture efforts, the conservation of existing aquatic resources, the rehabilitation and enhancement of the publicly owned fish and shellfish stocks, the encouragement of commercial aquaculture activities, the creation of new industries and job opportunities, and other national benefits.

(c) Aquaculture has a high potential for agumenting existing commercial and sport fisheries, thereby increasing the supply of aquatic protein for both human and animal consumption and assisting the United States in meeting its future food needs and contributing to the solution of world food problems. It is, therefore, in the national interest, and it is the national policy, to encourage the development of aquaculture.

SEC. 3. DEFINITIONS.

As used in this Act—

(1) The term "aquaculture" means the propagation and rearing of aquatic species in controlled or selected environments, including ocean ranching.

(2) The term "aquaculture facility" means any land, structure, or other appurtenance, if such land, structure, and appurtenance is located within the United States, which is used for aquaculture, including, but not limited to, any laboratory, vehicle, hatchery, rearing pond, raceway, pen, incubator, or other equipment.

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(3) The term "aquatic species" means any species, native or introduced, of finfish, mollusk or crustacean or other aquatic invertebrate, amphibian, reptile, or aquatic plant, other than any such species which is primarily used for ornamental purposes.

(4) The term "Fund" means the Federal Aquaculture Assistance Fund established by section 11.

(5) The term "person" means any individual who is a citizen or national of the United States and any corporation, partnership, association, or other entity (including, but not limited to, any community development corporation or fisherman's cooperative) organized or existing under the laws of any State.

(6) The term "Secretary" means the Secretary of Commerce.

(7) The term "State" means any of the several States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the Virgin Islands, Guam, the Trust Territory of the Pacific Islands, and any other Commonwealth, territory, or possession of the United States.

(8) The term "United States", when used in a geographical context, means all States.

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SEC. 4. NATIONAL AQUACULTURE DEVELOPMENT PLAN.

(a) (1) Before the close of the 1-year period beginning on the effective date of this Act, the Secretary, after consultation with the Secretary of the Interior and the Secretary of Agriculture, shall prepare a national aquaculture development plan (hereinafter in this Act referred to as the "plan").

(2) (A) The Secretary shall, after consultation with the Secretary of the Interior and the Secretary of Agriculture, establish an advisory committee for the purpose of assisting the Secretary in formulating a plan responsive to the various regional needs, interests, and approaches to the concept of aquaculture.

(B) Such advisory committee shall be composed of regional subcommittees. The subcommittee regions shall be established as follows:

(i) Eight regional subcommittees shall be created which correspond in geographical composition to the eight regional divisions created under section 302 (a) of the Fishery Conservation and Management Act of 1976.

(ii) Other regional subcommittees shall be created by the Secretary to represent the remaining nonoceanic States which are not a part of the regional subcommittees created by clause (i) of this subparagraph. Such other regional subcommittees shall be established on the basis of the following criteria:

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(I) geographical proximity of States to one another,

(II) similarity of States in aquacultural activities and potential, and

(III) other relevant factors.

(C) Membership of the regional advisory subcommittee from any region must include representatives of at least the following groups, where such groups exist in that region:

(i) State fish and game department;

(ii) commercial fishermen;

(iii) fishfood processors;

(iv) private sector aquaculture organizations;

(v) regional fishery management councils;

(vi) Federal Fish and Wildlife Agency;

(vii) recreational fishermen; and

(viii) educational institutions.

(D) The Governors of the various States shall appoint members to the regional advisory subcommittees.

(E) The members of the regional advisory committees established under subparagraph (B), while away from their homes or regular places of business in the performance of services for the committee, shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government serv-

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ice are allowed expenses under section 5703 of title 5, United States Code.

(b) The plan shall be formulated at the regional level and coordinated and finalized at the secretarial level. The final plan shall—

(1) identify those aquatic species (hereinafter referred to in this Act as "priority aquatic species") which the Secretary determines to have a potential for culturing on a commercial or other basis, which determination shall be made by the Secretary after taking into account—

(A) the extent of commercial aquaculture, if any, currently being carried out with respect to such species, and the projected biological and economic feasibility of culturing such species;

(B) the extent to which aquaculture research and development have been undertaken, within the public and private sectors, with respect to such species;

(C) the time and resources which will be required to develop aquaculture technology to the point where such species can be cultured on a commercial or other basis; and

(D) such other factors as the Secretary determines to be appropriate; and

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(2) contain an aquaculture development program, prepared by the Secretary, for each priority aquatic species.

(c) The aquaculture development program contained in the plan for each priority aquatic species shall set forth those actions which the Secretary determines should be undertaken, and the period of time within which each such action should be completed, to provide for the culture of each such species on a commercial or other basis. Such actions, with respect to each priority aquatic species, shall include—

(1) such research and development, technical assistance, demonstration, extension education, and training as may be necessary and appropriate regarding—

(A) aquaculture facility design and operation,

(B) water quality management,

(C) utilization of waste products (including thermal effluents),

(D) nutrition and the development of economical feeds,

(E) life history, genetics, physiology, and pathology and disease control (including research regarding organisms which may not be harmful to fish and shellfish but are injurious to humans),

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(F) processing and market development, and

(G) production management and quality control;

(2) research with respect to the effect of the culture of such species on estuarine and other water areas;

(3) the identification and analysis of any legal or regulatory constraints which may affect the culture of such species;

(4) the development of adequate supplies of seed stock;

(5) the construction, purchase, lease, or acquisition of necessary developmental aquaculture facilities; and

(6) such other actions relating to research and development, technical assistance, demonstration, extension education, and training as such Secretary deems necessary and appropriate.

(d) In preparing an aquaculture development program for any priority aquatic species, and in reviewing any such program pursuant to subsection (f), the Secretary shall, to the extent practicable, take into account any significant action which has been, or which is proposed to be undertaken by any other Federal agency, any State agency, or any person, and which may affect the accomplishment of the program.

(e) Each action under each aquaculture development

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program prepared under this section for a priority aquatic species shall be implemented, either individually, jointly, or collectively, by the Secretary, the Secretary of the Interior, or the Secretary of Agriculture, as specified by the Secretary in the program on the basis of—

(1) responsibilities vested in the respective Secretaries by law or any executive action having the effect of law (including, but not limited to, Reorganization Plan Numbered 4 of 1970) ; and

(2) in cases where paragraph (1) does not apply, the experience, expertise, and other appropriate resources which the department, over which the Secretary concerned has jurisdiction, may have with respect to the action required under the program.

(f) (1) The Secretary, in consultation with the Secretary of the Interior, the Secretary of Agriculture, and the chief executive officer of any other Federal agency, any appropriate Regional Fishery Management Council, and any State agency which has significant functions which relate to aquaculture, shall review on an annual basis—

(A) each aquatic species not identified as a priority aquatic species; and

(B) the aquaculture development program established under the plan for each priority aquatic species to determine whether the actions specified in the program

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are being accomplished on a successful and timely basis.

(2) If as a result of the review conducted pursuant to paragraph (1) (A), the Secretary determines, after taking into account the criteria set forth in subsection (b) (1), that any aquatic species has a potential for culturing on a commercial or other basis the Secretary shall by regulation amend the plan to identify such species as a priority aquatic species and prepare an aquaculture development program for such species pursuant to subsection (c).

(3) If as a result of the review conducted pursuant to paragraph (1) (B), the Secretary finds that—

(A) any action so specified should be revised, the Secretary shall make such revision to the program as he deems necessary and appropriate; or

(B) sufficient progress is not being made with respect to any such program or that actions taken under any such program indicate that culture of the priority aquatic species concerned is doubtful, the Secretary shall cancel the program.

The Secretary shall by regulation amend the plan whenever any revision or cancellation is made pursuant to this subsection.

SEC. 5. FUNCTIONS AND POWERS.

(a) In implementing the aquaculture development program prepared under section 4 for any priority aquatic

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species, the Secretary, the Secretary of the Interior, or the Secretary of Agriculture, as the case may be, shall—

(1) provide advisory, educational, and technical assistance (including training) with respect to culture of the species to interested public and private organizations and individuals, but in providing such assistance, shall, to the maximum extent practicable, avoid duplication of like assistance provided by other Federal agencies;

(2) consult and cooperate with interested persons, Federal, State, and local government agencies, regional commissions, and educational institutions regarding the development of aquaculture technology;

(3) produce, under the authority of section 4(c)(4), and sell at cost seed stock for the priority aquatic species when privately produced seed stock is unavailable, unreliable, or not sufficient to meet production needs;

(4) encourage the implementation of aquaculture technology in the rehabilitation and enhancement of the publicly owned fish and shellfish stocks, as well as the promotion of private commercial aquacultural enterprises;

(5) assist the development of aquaculture by requiring that in areas where multiple land and water

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uses exist, aquaculture should be viewed as an important use which should be given appropriate consideration; and

(6) prescribe such regulations as may be necessary to carry out such program.

(b) The Secretary, the Secretary of the Interior, or the Secretary of Agriculture may, incident to such Secretary's implementation of any aquaculture development program—

(1) for the purposes of assessing the biological and economic feasibility of any aquaculture system—

(A) conduct scale tests of the system, and, if necessary for the conduct of any such test, construct, operate, and maintain developmental aquaculture facilities, including, but not limited to, pilot plants for testing laboratory-scale results; and

(B) conduct such other tests or analyses as may be necessary;

(2) develop methods to enhance aquatic species stocks by aquaculture;

(3) carry out such studies and research with respect to aquatic species as may be appropriate regardless of whether such species is or has been identified as a priority aquatic species; and

(4) take such other actions as such Secretary deems necessary and appropriate.

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(c) In addition to carrying out such other functions as are required under this Act, the Secretary shall—

(1) establish and maintain an aquaculture information center which shall function as a national clearinghouse for the collection, selection, analysis, and dissemination of scientific, technical, legal, and economic information relating to aquaculture;

(2) conduct appropriate surveys, in coordination with other agencies, of public and private aquaculture being carried out in the United States with respect to each aquatic species for the purpose of acquiring information on acreages, water use, production, culture techniques, and other relevant matters;

(3) arrange for the mutual exchange of information relating to aquaculture with foreign nations; and

(4) conduct a continuing study to determine which existing capture fisheries could be adversely impacted in the marketplace by competition from products produced by commercial aquaculture enterprises significantly aided under this Act, which study shall include an assessment of economic impact by species and by geographical region, and recommended measures to ameliorate any adverse impact. The Secretary shall report to Congress on the findings made under such study

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no later than 2 years following the enc
Act and every 2 years thereafter.

Any production information submitted to the Secretary by any person under paragraph (2) shall be confidential and shall not be disclosed except to the Secretary, the Secretary of the Interior, or the Secretary of Agriculture, as the case may be, for purposes of carrying out this Act, the advisory committee which may be established under section 4(a)(2)(A), or when required under court order. The Secretary shall by regulation prescribe such procedures as may be necessary to preserve such confidentiality, except that the Secretary may release or make public any such information in any aggregate or summary form which does not directly or indirectly disclose the identity or business of any person who submits such information.

(d)(1) The Secretary, the Secretary of the Interior, and the Secretary of Agriculture are each authorized to accept any gift, temporary donation, or devise or bequest of real or personal property, or the proceeds therefrom, or interests therein, for use in carrying out any function the such Secretary may have under this Act. Any such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude, if such terms deemed by the Secretary concerned to be in accordanc

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law and compatible with the purpose for which acceptance is sought.

(2) Any gift or bequest of money, and any proceeds from the sale of other property received as a gift or bequest under this subsection, shall be deposited in a separate account in the Treasury and shall be disbursed upon the order of the Secretary concerned.

SEC. 6. COORDINATION OF FEDERAL AGENCY ACTIVITIES REGARDING AQUACULTURE.

(a) (1) There is established the Interagency Committee on Aquaculture (hereinafter in this section referred to as the "Committee") which shall be composed of the following officers or their designees:

(A) The Secretary, who shall be the Chairman of the Committee.

(B) The Secretary of the Interior.

(C) The Secretary of Agriculture.

(D) The Administrator of the Environmental Protection Agency.

(E) The Administrator of the Energy Research and Development Administration.

(F) The Commissioner of Food and Drugs.

(G) The Administrator of the Small Business Administration.

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(H) The Chief of Engineers.

(I) The chief executive officer of any other Federal agency and any Regional Fishery Management Council which the Secretary finds to have significant functions which relate, or may relate, to the development of aquaculture.

(2) The functions of the Committee shall be—

(A) to ensure that there is a continuing exchange of information among the agencies represented on the Committee with respect to the nature and status of the programs or projects being carried out by such agencies which relate, or which may relate, to aquaculture in general or to the implementation of the plan; and

(B) to review on a continuing basis the relevant programs and projects of all Federal agencies to determine whether they are being carried out in compliance with subsection (b).

(b) Each Federal agency which has any function or responsibility with respect to aquaculture or has jurisdiction over any activity which affects, or may affect, the achievement of the purposes of this Act, shall, in consultation with the Secretary and to the maximum extent practicable, carry out such function, responsibility, and activity in a manner which is consistent with the purposes of this Act.

(c) Nothing in this Act shall be construed to amend,

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, or otherwise modify the authority of any Federal officer or any Federal agency to carry out any functions relating to aquaculture which are authorized under any other provision of law.

SEC. 7. CONTRACTS AND GRANTS.

(a) The Secretary may carry out any function under this Act, and the Secretary of the Interior or the Secretary of Agriculture may carry out any function relating to any aquaculture development program which he is specified to implement under the plan, through grants to, or contracts with, any other Federal agency, any agency of any State and, subject to the approval of the State, any agency of any political subdivision thereof, any regional commission, any educational institution, or any other person.

(b) Any contract entered into, or any grant made, pursuant to this section shall contain such conditions and limitations as the Secretary concerned shall by regulation prescribe as being necessary and appropriate to protect the interests of the United States; except that no contract may be entered into, and no grant may be made, pursuant to this section unless the applicant submits with his application therefor a certification from each appropriate State agency and each appropriate local government agency stating that nothing in the laws administered by such agency prevents

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the carrying out of the project to which the contract or grant will be applied.

(c) The amount of any grant made pursuant to this section may not exceed one-half the estimated cost of the project for which the grant is made.

(d) Any person who receives a grant or contract under this section shall make available to the Secretary concerned and to the Comptroller General of the United States, or any of their authorized representatives, for purposes of audit and examination, any book, document, paper, and record that is pertinent to the funds received by such person under such grant or contract.

SEC. 8. GUARANTEES OF OBLIGATIONS ISSUED FOR AQUACULTURE FACILITIES.

(a) (1) The Secretary may, subject to the provisions of this section, guarantee, or make a commitment to guarantee, the payment of interest on, and the principal amount of, any obligation issued by an obligor for any of the following purposes:

(A) The financing of the construction, reconstruction, or reconditioning of any aquaculture facility (including the financing of the purchase cost of any aquaculture facility to be reconstructed or reconditioned); except that no obligation may be guaranteed under this section later than 2 years after the date

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of the completion of the construction, reconstruction, or reconditioning of the aquaculture facility involved.

(B) The acquisition of stocks of aquatic species for any aquaculture facility.

(C) The financing of the initial operating expenses of any aquaculture facility.

(D) The financing of marketing operations exclusively for aquaculture products.

(E) The refinancing of any existing obligation issued for any of the purposes specified in subparagraph (A), (B), (C), or (D), whether or not guaranteed under this section, including, but not limited to, any short-term obligation incurred for the purpose of obtaining temporary funds for refinancing.

Guarantees and commitments to guarantee may be made under this section without regard to section 3679 (a) of the Revised Statutes of the United States (31 U.S.C. 665 (a)).

(2) The full faith and credit of the United States is pledged to the payment of all guarantees made under this section with respect to both principal and interest, including any interest, if provided for in the guarantee, which may accrue between the date of default under a guaranteed obligation and the payment in full of the guarantee.

(3) Any guarantee, or commitment to guarantee, made by the Secretary under this section shall be conclusive evi-

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dence of the eligibility of the obligation for such guarantee, and the validity of any guarantee, or commitment of guarantee, so made shall be incontestable.

(4) The aggregate unpaid principal amount of all obligations guaranteed under this section and outstanding at any one time shall not exceed $500,000,000.

(b) (1) Obligations guaranteed under this section—

(A) shall have an obligor approved by the Secretary as being responsible and possessing the ability, experience, financial resources, and other qualifications necessary for the adequate operation and maintenance of the aquaculture facilities;

(B) shall be in an aggregate principal amount which does not exceed 87½ percent of the actual cost involved or the depreciated actual cost, as determined by the Secretary;

(C) shall have maturity dates satisfactory to the Secretary, but not to exceed 25 years;

(D) shall provide for payments by the obligor satisfactory to the Secretary; and

(E) shall bear interest (exclusive of charges for the guarantee and service charges, if any) at rates not to exceed such percentage per annum on the unpaid principal as the Secretary determines to be reasonable, taking into account the range of interest rates prevailing in

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the private market for similar loans and the risks assumed by the Secretary.

(2) In guaranteeing any obligation under this section, the Secretary shall give preference to any person with 40 or fewer employees which, together with its affiliates, is primarily engaged in the business of aquaculture or commercial fishing for aquatic species.

(3) No obligation shall be guaranteed under this section unless the obligor conveys or agrees to convey to the Secretary such security interest as the Secretary may require to reasonably protect the interests of the United States.

(c) (1) The Secretary may charge a fee for any obligation guaranteed under this section, the amount of which shall be established by the Secretary by regulation but which may not exceed one-half of 1 percent per annum of the outstanding principal balance of the obligation. Fee payments shall be made by the obligor to the Secretary when moneys are first advanced under a guaranteed obligation and at least 60 days before each anniversary date thereafter.

(2) The Secretary shall charge and collect from the obligor such amounts as he may deem reasonable for the investigation of the application for any guarantee, for the appraisal of properties offered as security for any guarantee,

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and for the inspection of such properties during construction, reconstruction, or reconditioning; except that such charges shall not aggregate more than one-half of 1 percent of the original principal amount of the obligation to be guaranteed.

(3) All fees and other amounts received by the Secretary under the provisions of this subsection shall be deposited in the Fund.

(4) Obligations guaranteed under this section, and agreements relating thereto, shall contain such other provisions with respect to the protection of the security interests of the United States (including acceleration and subrogation provisions and the issuance of notes by the obligor to the Secretary), liens and releases of liens, payments of taxes, and such other matters as the Secretary may prescribe.

(d) (1) In the event of a default, which has continued for 30 days, in any payment by the obligor of principal or interest due under any obligation guaranteed under this section, the obligee or his agent shall have the right to demand, at or before the expiration of such period as may be specified in the guarantee or related agreements, but not later than 90 days from the date of such default, payment by the Secretary of the unpaid principal amount of said obligation and of the unpaid interest thereon to the date of payment. Within such period as may be specified in the

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guarantee or related agreements, but not later than 30 days from the date of such demand, the Secretary shall promptly pay to the obligee or his agent the unpaid principal amount of the obligation and unpaid interest thereon to the date of payment; except that the Secretary shall not be required to make such payment if before the expiration of such period he finds that there was no default by the obligor in the payment of principal or interest or that such default has been remedied before any such demand.

(2) Payments required to be made by the Secretary under paragraph (1) shall be made by the Secretary from the Fund.

(3) In the event of any payment by the Secretary under paragraph (1), the Secretary shall have all rights in any security held by him relating to his guarantee of such obligations as are conferred upon him under any security agreement with the obligor. Notwithstanding any other provision of law relating to the acquisition, handling, or disposal of property by the United States, the Secretary may, under such terms and conditions as the Secretary prescribes or approves, complete, recondition, reconstruct, renovate, repair, maintain, operate, or sell any property acquired by him pursuant to a security agreement with the obligor.

(4) After any default referred to in paragraph (1), the Secretary shall take such action against the obligor or

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any other parties liable thereunder that, in his discretion, may be required to protect the interests of the United States. Any suit may be brought in the name of the United States or in the name of the obligee and the obligee shall make available to the United States all records and evidence necessary to prosecute any such suit. The Secretary may accept a conveyance of title to and possession of property from the obligor or other parties liable to the Secretary and may purchase the property for an amount not greater than the unpaid principal amount of such obligation and interest thereon. In the event the Secretary receives through the sale of property an amount of cash in excess of any payment made to an obligee under paragraph (1) and the expenses of collection of such amounts, he shall pay such excess to the obligor.

(5) Whoever, for the purpose of obtaining any loan or advance of credit from any person with the intent that an obligation relating to such loan or advance of credit shall be offered to or accepted by the Secretary to be guaranteed, or for the purpose of obtaining any extension or renewal of any loan, advance of credit, or mortgage relating to an obligation guaranteed by the Secretary, or the acceptance, release, or substitution of any security on such a loan, advance of credit, or for the purpose of influencing in any way the action of the Secretary under this section, makes,

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passes, utters, or publishes, or causes to be made, passed, uttered, or published any statement, knowing the same to be false, or alters, forges, or counterfeits, or causes or procures to be altered, forged, or counterfeited, any instrument, paper, or document, or utters, publishes, or passes as true, or causes to be uttered, published, or passed as true, any instrument, paper, or document, knowing it to have been altered, forged, or counterfeited, or willfully overvalues any security, asset, or income shall be punished by a fine of not more than $5,000, or by imprisonment for not more than 2 years, or both.

(e) The Secretary shall promulgate such rules and regulations as may be deemed necessary or appropriate to carry out the purposes and provisions of this section.

(f) For purposes of this section—

(1) The term "actual cost" of an aquaculture facility, as of any specified date, means the aggregate, as determined by the Secretary, of—

(A) all amounts paid by, or for the account of, the obligor with respect to such facility on or before that date; and

(B) all amounts which the obligor is then obligated to pay from time to time thereafter, for the construction, reconstruction, or reconditioning of such facility.

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(2) The terms "construction", "reconstruction", or "reconditioning" include, but are not limited to, designing, inspecting, outfitting, and equipping of the aquaculture facility involved.

(3) The term "depreciated actual cost" means the actual cost depreciated on a straightline basis over the useful life of the property involved as determined by the Secretary.

(4) The term "obligation" means any note, bond, debenture, or other evidence of indebtedness issued for one of the purposes specified in subsection (a).

(5) The term "obligee" means the holder of any obligation.

(6) The term "obligor" means any person primarily liable for payment of the principal of or interest on any obligation.

SEC. 9. DISASTER LOANS.

(a) (1) The Secretary may make one or more loans from the Fund to any person if—

(A) an aquaculture facility, or stock of aquatic species at the facility, or both, that is owned by such person is damaged or destroyed as a result of a natural disaster; or

(B) the stock of aquatic species at an aquaculture facility owned by such person is damaged or destroyed

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by disease, pollution, or contamination (caused by persons other than a natural disaster or the willful or negligent action of such person).

The purpose of any loan made by the Secretary under this section shall be to accomplish one or more of the following objectives:

(i) The repair, rehabilitation, or replacement of such facility.

(ii) The replacement of aquatic species stock.

(iii) To continue aquaculture operations while any such repair, rehabilitation, or replacement is in progress.

(iv) The purchase, construction, or reconstruction of an aquaculture facility at another location if the Secretary finds that—

(I) the damage to the facility is so extensive that its repair or rehabilitation is impracticable;

(II) the replacement of the destroyed facility at the same location is impracticable; or

(III) the pollution or contamination referred to in subparagraph (B) is likely to persist for such period of time that continued aquaculture operations at the same location are impracticable.

(v) To meet payments of principal and interest on any obligation of such person with respect to the facility or stock so damaged or destroyed for such period of time

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as the Secretary deems appropriate, taking into account the degree of such damage or destruction.

(vi) To retire in full any such obligation.

(2) No loan may be made under this section for any damage or destruction—

(A) which is fully compensated for by insurance (including insurance paid under section 10) or otherwise; or

(B) for which assistance is available under any other Federal disaster assistance program.

(b) Any loan made pursuant to this section shall—

(1) mature in not more than 20 years;

(2) bear interest at a rate not less than the rate determined by the Secretary of the Treasury taking into consideration the average market yield on outstanding Treasury obligations of comparable maturity;

(3) be approved only upon the furnishing of such security or other reasonable assurance of repayment as the Secretary may require; and

(4) be subject to such other terms and conditions as the Secretary may require to protect the interests of the United States.

(c) The Secretary may consent to the modification of any term or condition of any loan made under this section, including, but not limited to, reduction of the rate of inter-

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est, deferment of any installment of principal or interest, or change in any security requirement.

(d) All payments of principal and interest on loans made under this section shall be deposited into the Fund.

(e) For purposes of this section, the term "obligation" means any note, bond, debenture, or other evidence of indebtedness issued for the purpose of financing (1) the construction, reconstruction, or reconditioning of an aquaculture facility, (2) the initial operating expenses of any such facility, and (3) the acquisition of stock of aquatic species for any such facility.

(f) (1) Whoever makes any statement knowing it to be false, or whoever willfully overvalues any security for the purpose of obtaining for himself or for any applicant any loan under this section, or extension thereof by renewal, deferment of action, or otherwise, or the acceptance, release, or substitution of security therefor, or for the purpose of influencing in any way the action of the Secretary under this section, or for the purpose of obtaining money, property, or anything of value under this section, shall be punished by a fine of not more than $5,000, or by imprisonment for not more than 2 years, or both.

(2) Whoever, with the intent to defraud, knowingly conceals, removes, disposes of, or converts to his own use or to that of another, any property mortgaged or pledged to,

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or held by, the Secretary pursuant to this section shall be punished by a fine of not more than $5,000, or by imprisonment for not more than 5 years, or both.

(g) No loan may be made by the Secretary under this section for any damage to, or destruction of, any aquaculture facility or stock of aquatic species which occurs on or after the close of the 5-year period beginning on the effective date of this Act.

SEC. 10. INSURANCE AGAINST CERTAIN LOSSES INCURRED IN AQUACULTURE FACILITY OPERATIONS.

(a) As used in this section, unless the context otherwise requires—

(1) The term "direct insurance" means any insurance described in paragraphs (2), (3), and (4).

(2) The term "essential liability insurance" means insurance against all sums which the owner of an aquaculture facility becomes legally obligated to pay as damages because of bodily injury or property damage caused by the aquaculture facility, the operation of such facility, or the aquatic species cultured at such facility.

(3) The term "essential property insurance" means insurance against direct loss of, or direct damage to, the real or personal property of an aquaculture facility caused by perils as they are defined and limited in

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standard fire policies and extended coverage endorsements thereon as approved by the State insurance authority, and insurance against loss of, or damage to, the real or personal property of an aquaculture facility from such perils as the Secretary by regulation shall specify, including, but not limited to vandalism, malicious mischief, burglary, and theft.

(4) The term "essential stock insurance" means insurance against loss of, or damage to, any aquatic species being cultured at an aquaculture facility due to unavoidable or natural causes, including, but not limited to, drought, pollution, hail, frost, wind, winterkill, freeze, lightning, fire, excessive rain, flood, snow, wildlife, hurricane, tornado, insect or parasite infestation, disease, and such other unavoidable or natural causes as the Secretary by regulation shall specify.

(5) The term "insurer" includes any insurance company or group of companies under common ownership which is authorized to engage in the insurance business under the laws of any State.

(6) The term "owner" means any person having an insurable interest in an aquaculture facility or aquatic species stock.

(7) The term "pool" means any pool or association of insurers in any State which is formed, associated, or

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otherwise created for the purpose of making insurance more readily available.

(8) The term "reasonable premium rate" means that premium rate determined by the Secretary, which would permit the purchase of any direct insurance coverage by a reasonably prudent person in similar circumstances with due regard to the costs and benefits involved.

(b) The Secretary may by regulation define any technical or trade term necessary in the administration of this section, insofar as any such definition is not inconsistent with the provisions of this section.

(c) (1) The Secretary shall conduct, within 6 months after the effective date of this Act, and annually thereafter, a study to determine whether direct insurance is generally available to owners at reasonable premium rates, through insurers, pools, or a suitable program adopted under State law.

(2) (A) If the Secretary finds, as a result of the study referred to in paragraph (1), that essential property insurance or essential liability insurance is not available at reasonable premium rates in any State and such insurance has not been provided by State action, the Secretary may establish a program to provide such insurance in such State, if the Secretary considers the issuance of such insurance neces-

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sary and appropriate to carry out the purposes and policy of this Act.

(B) Any essential property insurance or essential liability insurance issued by the Secretary under this paragraph shall be subject to such terms and conditions, and to such deductibles and other restrictions and limitations as the Secretary deems appropriate; except that the Secretary may not provide essential property insurance or essential liability insurance with respect to—

(i) any aquaculture facility or stock of aquatic species which the Secretary determines to be uninsurable due to the failure of the owner to follow established principles for operating aquaculture facilities or culturing aquatic species, as the case may be; or

(ii) any aquaculture facility which the Secretary determines to lack reasonable protective measures to prevent loss or damage.

(3) (A) If the Secretary finds, as a result of the study referred to in paragraph (1), that essential stock insurance is not available at reasonable premium rates in any State and that such insurance has not been provided by State action, the Secretary shall establish a program to provide such insurance in such State.

(B) Any essential stock insurance issued by the Secretary under this paragraph shall be subject to such terms

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and conditions and to such deductibles and other restrictions and limitations as the Secretary deems appropriate; except that the Secretary may not provide essential stock insurance with respect to any stock of aquatic species if the Secretary determines such stock to be uninsurable due to the failure of the owner to follow established principles for culturing aquatic species or due to the lack of reasonable protective measures at the aquaculture facility concerned to prevent the loss of, or damage to, the stock being cultured.

(d) (1) In determining the premium rate for any direct insurance offered from time to time under subsection (c) (2) or (3), the Secretary shall consult with persons knowledgeable and experienced in insurance, including, but not limited to, State insurance regulatory authorities, and may take into consideration with respect to the insurance concerned, the nature and degree of risk involved, the protective devices employed, the extent of past and anticipated losses, the prevailing rate for similar coverages, the economic importance of the insurance, and the relative abilities of the particular classes and types of insureds to pay the actual premium for such coverage.

(2) (A) The Secretary may not establish the premium rate for any direct insurance at less than 50 percent of the actual premium rate for such insurance.

(B) For purposes of subparagraph (A), the actual

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premium rate for any direct insurance offered under this section shall be determined as follows:

(i) If insurance of the same kind is generally offered by insurers or pools in the State concerned, the actual premium rate shall be that rate which the Secretary determines to be the median premium rate for all such insurance so offered.

(ii) If insurance of the same kind is not generally offered by insurers or pools in the State concerned, the actual premium rate shall be that rate which the Secretary determines to be the rate at which insurers or pools in such State would offer such insurance, taking into account actuarially sound principles applicable to the elements making up such rate, including, but not limited to, claim losses, general administrative expenses, acquisition expenses, taxes, license fees, and profits.

In making determinations under clauses (i) and (ii), the Secretary shall consult with the insurance regulatory authority of the State concerned and any rate advisory organization licensed by such State.

(3) Nothing in this section shall be construed to prohibit or require either the adoption of uniform national rates or the periodic modification of the currently estimated reasonable premium rates for any particular coverage, class,

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loss experience.

(e) (1) The Secretary may enter into any contract, agreement, treaty, or other arrangement with any insurer or pool to provide reinsurance coverage with respect to any direct insurance issued by such insurer or pool, in consideration of payment of such premiums, fees, or other charges by insurers or pools which the Secretary deems to be appropriate, after consultation with persons knowledgeable and experienced in insurance.

(2) Reinsurance issued under this subsection shall reimburse an insurer or pool for its total proved and approved claims for covered losses resulting from providing the direct insurance concerned during the term of the reinsurance contract, agreement, treaty, or other arrangement, over and above the amount of the insurer's or pool's retention of such losses, as provided in such reinsurance, contract, agreement, treaty, or other arrangement entered into under this section.

(3) Such contracts, agreements, treaties, or other arrangements may be made without regard to section 3679 (a) of the Revised Statutes of the United States (31 U.S.C. 665 (a)), and shall include any terms and conditions which the Secretary deems necessary to carry out the purposes of this section. The premium rates and terms and conditions of such contracts, agreements, treaties, or other ar-

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rangements with an insurer or pool shall be uniform in any one year throughout the country.

(f) (1) All premiums received by the Secretary under this section shall be deposited into the Fund.

(2) The Secretary, in a suit brought in the appropriate United States district court, shall be entitled to recover from any owner, insurer, or pool the amount of any unpaid premium lawfully payable to the Secretary by such owner, insurer, or pool under any direct insurance or reinsurance issued under this section.

(3) No action or proceeding shall be brought for the recovery of any premium due the Secretary, or for the recovery of any premium paid to the Secretary in excess of the amount due, unless such action or proceeding is commenced within 5 years after the right accrued for which the claim is made; except that, if the insurer has made or filed with the Secretary a false or fraudulent statement or other document with intent to evade, in whole or in part, the payment of premiums, the claim shall not be deemed to have accrued until its discovery by the Secretary.

(g) In order to provide for maximum efficiency in the administration of the insurance and reinsurance program provided under this section, and in order to facilitate the expeditious payment of any claims under such program, the Secretary may enter into contracts with any insurer, pool,

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or person, for the purpose of providing for the performance of any of the following functions:

(1) The estimation or determination of any amounts of payments for reinsurance or direct insurance claims.

(2) The receipt, disbursement, and accounting for funds in making payments for reinsurance and direct insurance claims.

(3) The auditing of the records of any insurer, pool, or person to the extent necessary to assure that proper payments are made.

(4) The establishment of the basis of liability for reinsurance or direct insurance payments, including the total amount of proved and approved claims which may be payable to any insurer, pool, or owner, and the total amount of premiums earned by any insurer or pool in the respective States from direct insurance or reinsurance.

(5) The provision of assistance in any manner provided for in the contract to further the purposes of this section.

(h) The Secretary may, with the consent of the agency concerned, accept and utilize, on a reimbursable basis, the officers, employees, services, facilities, and information of any Federal agency with respect to any insurance matter which is within the purview of this section.

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(i) The Secretary may prescribe regulations establishing the general method or methods by which proved and approved claims for losses are paid under any direct insurance or reinsurance issued under this section. Proved and approved claims shall be paid from the Fund.

(j) The Secretary, in providing any direct insurance or reinsurance under this section may adjust and pay all claims for proved and approved losses covered by such insurance and, upon the disallowance by the Secretary, or upon the refusal of the claimant to accept the amount allowed upon any such claim, the claimant, within one year after the date of mailing of notice of disallowance or partial disallowance of the claim, may institute an action on such claim against the Secretary in the United States district court for the district in which the insured owner or reinsured insurer or pool resides or principally conducts business, and jurisdiction is hereby conferred upon such court to hear and determine such action without regard to the amount in controversy.

(k) The face amount of direct insurance and reinsurance coverage outstanding and in force at any one time under this section shall not exceed $1,000,000,000.

(l) No direct insurance or reinsurance may be issued by the Secretary under this section after the close of the 5-year period beginning on the effective date of this Act.

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SEC. 11. FEDERAL AQUACULTURE ASSISTANCE FUND.

(a) There is established in the Treasury of the United States a Federal Aquaculture Assistance Fund. The Fund shall be available to the Secretary as a revolving fund for the purpose of carrying out, and administering, sections 8, 9, and 10. The Fund shall consist of—

(1) any sums appropriated to the Fund;

(2) any fees received by the Secretary in connection with any guarantee made under section 8;

(3) recoveries and receipts received by the Secretary under security, subrogation, and other rights and authorities under sections 8, 9, and 10;

(4) payments of principal and interest received by the Secretary under any loan made under section 9;

(5) premiums paid to, or recovered by, the Secretary for any direct insurance or reinsurance issued by the Secretary under section 10; and

(6) moneys deposited pursuant to the last sentence of subsection (b).

All payments made by the Secretary to carry out the provisions of sections 8, 9, and 10 (including reimbursements to other Government accounts) shall be paid from the Fund, only to the extent provided in appropriation Acts. Sums in the Fund which are not currently needed for the purposes of sections 8, 9, and 10 shall be kept on deposit or

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invested in obligations of, or guaranteed by, the United States.

(b) If at any time the moneys in the Fund are not sufficient to pay any amount the Secretary is obligated to pay under section 8(d)(1) or any direct insurance or reinsurance claim under section 10, the Secretary shall issue to the Secretary of the Treasury notes or other obligations (only to such extent and in such amounts as may be provided for in appropriation Acts) in such forms and denominations, bearing such maturities, and subject to such terms and conditions as the Secretary of the Treasury prescribes. Such notes or other obligations shall bear interest at a rate determined by the Secretary of the Treasury, taking into consideration the current average market yield on outstanding marketable obligations of the United States of comparable maturities during the month preceding the issuance of such notes or other obligations. The Secretary of the Treasury shall purchase any notes and other obligations to be issued hereunder and for such purpose he may use as a public debt transaction the proceeds from the sale of any securities issued under the Second Liberty Bond Act, as amended, and the purposes for which securities may be issued under such Act, as amended, are extended to include any purchases of such notes and obligations. The Secretary of the Treasury at any time may sell any of the notes or other obligations acquired

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by him under this subsection. All redemptions, purchases, and sales by the Secretary of the Treasury of such notes or other obligations shall be treated as public debt transactions of the United States. Moneys borrowed under this subsection shall be deposited in the Fund and redemptions of such notes and obligations shall be made by the Secretary from the Fund.

SEC. 12. REPORT AND RECOMMENDATIONS.

Before the close of the 90th day after the close of the 3-year period beginning on the effective date of this Act, the Secretary shall review the operation and effectiveness of the disaster loan program provided for under section 9 and the insurance program provided for under section 10 and shall submit a report thereon to the Congress, together with the recommendation of the Secretary as to whether or not either such program should be continued and, if the Secretary recommends continuation, such suggestions as the Secretary may have for improving the operation and effectiveness of such program.

SEC. 13. AUTHORIZATION OF APPROPRIATIONS.

(a) For purposes of carrying out the provisions of this Act (other than sections 8, 9, or 10), there are authorized to be appropriated, notwithstanding any authorization for appropriations in any other Act in effect before the date of the enactment of this Act—

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(1) to the Department of Commerce, not to exceed—

(A) $4,000,000 for the fiscal year 1979,

(B) $15,000,000 for the fiscal year 1980, and

(C) $17,000,000 for the fiscal year 1981;

(2) to the Department of the Interior, not to exceed—

(A) $2,000,000 for the fiscal year 1979,

(B) $7,500,000 for the fiscal year 1980, and

(C) $8,500,000 for the fiscal year 1981; and

(3) to the Department of Agriculture, not to exceed—

(A) $2,000,000 for the fiscal year 1979,

(B) $7,500,000 for the fiscal year 1980, and

(C) $8,500,000 for the fiscal year 1981.

(b) There are authorized to be appropriated, without fiscal year limitation, to the Fund such sums as may be necessary and appropriate for purposes of carrying out sections 8, 9, and 10; but not to exceed $500,000,000 for the purposes of section 8 and not to exceed $250,000,000 for the purposes of section 9.

SEC. 14. EFFECTIVE DATE.

This Act shall take effect October 1, 1978.

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95TH CONGRESS
2D SESSION

H. R. 9370

IN THE SENATE OF THE UNITED STATES

FEBRUARY 20 (legislative day, FEBRUARY 6), 1978
Read twice and referred to the Committee on Commerce, Science, and Transportation

AN ACT

To provide for the development of aquaculture in the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Aquaculture Organic Act of 1978".

SEC. 2. FINDINGS, PURPOSE, AND POLICY.

(a) The Congress finds the following:

(1) The world production of seafood has declined since 1970 and the harvest of some populations of fish and shellfish has exceeded levels of maximum sustainable yield.

(2) Certain stocks of fish and shellfish of impor-

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tance to the United States are depleted, or are declining, and such depletion or decline has an undesirable impact on both commercial and recreational fisheries.

(3) There is an extensive market for seafood in the United States, but the United States imports in excess of 50 percent of its fish and shellfish for human consumption (which imports are ten times the level of exports), and this dependence on imports as a source of protein makes it difficult to insure continuous supplies and suggests that alternatives such as aquaculture be developed.

(4) Many segments of the world population are now facing serious nutritional deficiencies and food shortages due to adverse climatic conditions and the steady growth of population. These problems will become more severe, and the resulting demand for increased food production will have to be met chiefly through the application of scientific and technological advances from research on aquaculture and other food production systems.

(5) Aquaculture is contributing significantly to world food supplies with production equal to 10 percent of current landings of seafoods and has the potential for increase by a factor of five before the end of this century.

(6) Less than 3 percent of current United States

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fisheries production results from aquaculture but there is a good potential for expanding production from aquaculture to equal or exceed the worldwide average, thereby helping to provide United States consumers with stable supplies of high quality aquatic foods.

(7) Growth of aquatic plants is a source of food for human and animal consumption as well as a source of industrial materials and energy. The Congress recognizes the importance of developing aquaculture of both plant and animal species.

(8) The stocking of advanced life stages of fish and shellfish produced by aquaculture is a means of rebuilding and augmenting fish and shellfish populations and establishing new fisheries.

(9) The application of aquaculture technology offers opportunities for the recovery of wasted thermal energy, nutrients, and other resources and may be a more efficent use of these resources for food production than current methods of agriculture.

(10) Water, whether fresh, brackish, or marine, which is suitable for aquaculture is diminishing or in many cases is underutilized.

(11) Where land-use management policies may inhibit the development of aquaculture facilities in areas suitable for aquaculture, consideration should be given

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to the utilization of these areas for aquaculture along with the other uses of such areas.

(12) Current efforts to develop aquaculture in the United States are highly diffuse, and a strong commitment by the Federal Government will make aquaculture more efficient and competitive, thereby stimulating public and private investment and development.

(13) While many scientific and technological problems are unsolved, there is sufficient knowledge to further the development of aquaculture production systems for many species of fish and shellfish.

(14) The development of aquaculture in the United States has been limited by the inability of producers of aquatic species to obtain adequate capital and a reliable source of seed stock.

(15) Aquaculture in the United States has traditionally concentrated on a few aquatic species, but many others have a potential for commercial and other culture. However, the culture of additional species may include a higher degree of risk than the culture of traditional species, especially during the initial stages.

(16) Government programs that help to reduce the risks associated with production of agricultural commodities have not been generally available to producers of those aquatic species in which the risk is high.

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(b) The purpose of this Act is to promote aquaculture in the United States by—

(1) declaring a national aquaculture policy;

(2) establishing and implementing a national plan for aquaculture; and

(3) developing programs and encouraging activities;

which will result in the coordination of domestic aquaculture efforts, the conservation and increased availability of fisheries resources, the creation of new industries and job opportunities, and other national benefits.

(c) Aquaculture has a high potential for agumenting existing commercial and sport fisheries, thereby increasing the supply of aquatic protein for both human and animal consumption and assisting the United States in meeting its future food needs and contributing to the solution of world food problems. It is, therefore, in the national interest, and it is the national policy, to encourage the development of aquaculture.

SEC. 3. DEFINITIONS.

As used in this Act—

(1) The term "aquaculture" means the propagation and rearing of aquatic species in controlled or selected environments, including ocean ranching.

(2) The term "aquaculture facility" means any

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land, structure, or other appurtenance, if such land, structure, and appurtenance is located within the United States, which is used for aquaculture, including, but not limited to, any laboratory, hatchery, rearing pond, raceway, pen, incubator, or other equipment.

(3) The term "aquatic species" means any species, native or introduced, of finfish, mollusk or crustacean or other aquatic invertebrate, amphibian, reptile, or aquatic plant, other than any such species which is primarily used for ornamental purposes.

(4) The term "Fund" means the Federal Aquaculture Assistance Fund established by section 11.

(5) The term "person" means any individual who is a citizen or national of the United States and any corporation, partnership, association, or other entity (including, but not limited to, any community development corporation or fisherman's cooperative) organized or existing under the laws of any State.

(6) The term "Secretary" means the Secretary of Commerce.

(7) The term "State" means any of the several States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the Virgin Islands, Guam, the Trust Territory of the Pacific Islands, and

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any other Commonwealth, territory, or possession of the United States.

(8) The term "United States", when used in a geographical context, means all States.

SEC. 4. NATIONAL AQUACULTURE DEVELOPMENT PLAN.

(a) (1) Before the close of the 1-year period beginning on the effective date of this Act, the Secretary, after consultation with the Secretary of the Interior, the Secretary of Agriculture, and the chief executive officer of any other Federal agency, any appropriate Regional Fishery Management Council established under section 302 of the Fishery Conservation and Management Act of 1976, and any State agency which has significant functions which relate to aquaculture, shall by regulation establish a National Aquaculture Development Plan (hereinafter in this Act referred to as the "plan"). The Secretary shall give interested persons an opportunity to participate in the rulemaking in accordance with the provisions of section 553 of title 5, United States Code.

(2) (A) If the Secretary deems it appropriate, the Secretary may, after consultation with the Secretary of the Interior and the Secretary of Agriculture, establish and appoint members of an advisory committee to assist in the initial development of the plan. Persons appointed to the committee

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shall be knowledgeable or experienced in the principles or practices of aquaculture.

(B) If an advisory committee is established under subparagraph (A), the members of the committee, while away from their homes or regular places of business in the performance of services for the committee, shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed expenses under section 5703 of title 5 of the United States Code.

(b) The plan shall—

(1) identify those aquatic species (hereinafter referred to in this Act as "priority aquatic species") which the Secretary determines to have a potential for culturing on a commercial or other basis, which determination shall be made by the Secretary after taking into account—

(A) the extent of commercial aquaculture, if any, currently being carried out with respect to such species, and the projected biological and economic feasibility of culturing such species;

(B) the extent to which aquaculture research and development have been undertaken, within the public and private sectors, with respect to such species;

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(C) the time and resources which will be required to develop aquaculture technology to the point where such species can be cultured on a commercial or other basis; and

(D) such other factors as the Secretary determines to be appropriate; and

(2) contain an aquaculture development program, prepared by the Secretary, for each priority aquatic species.

(c) The aquaculture development program contained in the plan for each priority aquatic species shall set forth those actions which the Secretary determines should be undertaken, and the period of time within which each such action should be completed, to provide for the culture of each such species on a commercial or other basis. Such actions, with respect to each priority aquatic species, shall include—

(1) such research and development, technical assistance, demonstration, extension education, and training as may be necessary and appropriate regarding—

(A) aquaculture facility design and operation,

(B) water quality management,

(C) utilization of waste products (including thermal effluents),

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(D) nutrition and the development of economical feeds,

(E) life history, genetics, physiology, and pathology and disease control (including research regarding organisms which may not be harmful to fish and shellfish but are injurious to humans),

(F) processing and market development, and

(G) production management and quality control;

(2) research with respect to the effect of the culture of such species on estuarine and other water areas;

(3) the identification and analysis of any legal or regulatory constraints which may affect the culture of such species;

(4) the development of adequate supplies of seed stock;

(5) the construction, purchase, lease, or acquisition of necessary developmental aquaculture facilities; and

(6) such other actions relating to research and development, technical assistance, demonstration, extension education, and training as such Secretary deems necessary and appropriate.

(d) In preparing an aquaculture development program for any priority aquatic species, and in reviewing any

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such program pursuant to subsection (f), the Secretary shall, to the extent practicable, take into account any significant action which has been, or which is proposed to be undertaken by any other Federal agency, any State agency, or any person, and which may affect the accomplishment of the program.

(e) Each action under each aquaculture development program prepared under this section for a priority aquatic species shall be implemented, either individually, jointly, or collectively, by the Secretary, the Secretary of the Interior, or the Secretary of Agriculture, as specified by the Secretary in the program on the basis of—

(1) responsibilities vested in the respective Secretaries by law or any executive action having the effect of law (including, but not limited to, Reorganization Plan Numbered 4 of 1970); and

(2) in cases where paragraph (1) does not apply, the experience, expertise, and other appropriate resources which the department, over which the Secretary concerned has jurisdiction, may have with respect to the action required under the program.

(f) (1) The Secretary, in consultation with the Secretary of the Interior, the Secretary of Agriculture, and the chief executive officer of any other Federal agency, any ap-

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propriate Regional Fishery Management Council, and any State agency which has significant functions which relate to aquaculture, shall review on an annual basis—

(A) each aquatic species not identified as a priority aquatic species; and

(B) the aquaculture development program established under the plan for each priority aquatic species to determine whether the actions specified in the program are being accomplished on a successful and timely basis.

(2) If as a result of the review conducted pursuant to paragraph (1) (A), the Secretary determines, after taking into account the criteria set forth in subsection (b) (1), that any aquatic species has a potential for culturing on a commercial or other basis the Secretary shall by regulation amend the plan to identify such species as a priority aquatic species and prepare an aquaculture development program for such species pursuant to subsection (c).

(3) If as a result of the review conducted pursuant to paragraph (1) (B), the Secretary finds that—

(A) any action so specified should be revised, the Secretary shall make such revision to the program as he deems necessary and appropriate; or

(B) sufficient progress is not being made with respect to any such program or that actions taken under any such program indicate that culture of the priority

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aquatic species concerned is doubtful, the Secretary shall cancel the program.

The Secretary shall by regulation amend the plan whenever any revision or cancellation is made pursuant to this subsection.

SEC. 5. FUNCTIONS AND POWERS.

(a) In implementing the aquaculture development program prepared under section 4 for any priority aquatic species, the Secretary, the Secretary of the Interior, or the Secretary of Agriculture, as the case may be, shall—

(1) provide advisory, educational, and technical assistance (including training) with respect to culture of the species to interested public and private organizations and individuals, but in providing such assistance, shall, to the maximum extent practicable, avoid duplication of like assistance provided by other Federal agencies;

(2) consult and cooperate with interested persons, Federal, State, and local government agencies, regional commissions, and educational institutions regarding the development of aquaculture technology;

(3) produce, under the authority of section 4(c)(4), and sell at cost seed stock for the priority aquatic species when privately produced seed stock is unavail-

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able, unreliable, or not sufficient to meet production needs; and

(4) prescribe such regulations as may be necessary to carry out such program.

(b) The Secretary, the Secretary of the Interior, or the Secretary of Agriculture may, incident to such Secretary's implementation of any aquaculture development program—

(1) for the purposes of assessing the biological and economic feasibility of any aquaculture system—

(A) conduct scale tests of the system, and, if necessary for the conduct of any such test, construct, operate, and maintain developmental aquaculture facilities, including, but not limited to, pilot plants for testing laboratory-scale results; and

(B) conduct such other tests or analyses as may be necessary;

(2) develop methods to enhance aquatic species stocks by aquaculture;

(3) carry out such studies and research with respect to aquatic species as may be appropriate regardless of whether such species is or has been identified as a priority aquatic species; and

(4) take such other actions as such Secretary deems necessary and appropriate.

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(c) In addition to carrying out such other functions as are required under this Act, the Secretary shall—

(1) establish and maintain an aquaculture information center which shall function as a national clearinghouse for the collection, selection, analysis, and dissemination of scientific, technical, legal, and economic information relating to aquaculture;

(2) conduct appropriate surveys, in coordination with other agencies, of public and private aquaculture being carried out in the United States with respect to each aquatic species for the purpose of acquiring information on acreages, water use, production, culture techniques, and other relevant matters;

(3) arrange for the mutual exchange of information relating to aquaculture with foreign nations; and

(4) conduct a continuing study to determine which existing capture fisheries could be adversely impacted in the marketplace by competition from products produced by commercial aquaculture enterprises significantly aided under this Act, which study shall include an assessment of economic impact by species and by geographical region, and recommended measures to ameliorate any adverse impact. The Secretary shall report to Congress on the findings made under such study

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no later than 2 years following the effective date of this Act and every 2 years thereafter.

Any production information submitted to the Secretary by any person under paragraph (2) shall be confidential and shall not be disclosed except to the Secretary, the Secretary of the Interior, or the Secretary of Agriculture, as the case may be, for purposes of carrying out this Act, the advisory committee which may be established under section 4(a) (2) (A), or when required under court order. The Secretary shall by regulation prescribe such procedures as may be necessary to preserve such confidentiality, except that the Secretary may release or make public any such information in any aggregate or summary form which does not directly or indirectly disclose the identity or business of any person who submits such information.

(d) (1) The Secretary, the Secretary of the Interior, and the Secretary of Agriculture are each authorized to accept any gift, temporary donation, or devise or bequest of real or personal property, or the proceeds therefrom, or interests therein, for use in carrying out any function that such Secretary may have under this Act. Any such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude, if such terms are deemed by the Secretary concerned to be in accordance with

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law and compatible with the purpose for which acceptance is sought.

(2) Any gift or bequest of money, and any proceeds from the sale of other property received as a gift or bequest under this subsection, shall be deposited in a separate account in the Treasury and shall be disbursed upon the order of the Secretary concerned.

SEC. 6. COORDINATION OF FEDERAL AGENCY ACTIVITIES REGARDING AQUACULTURE.

(a) (1) There is established the Interagency Committee on Aquaculture (hereinafter in this section referred to as the "Committee") which shall be composed of the following officers or their designees:

(A) The Secretary, who shall be the Chairman of the Committee.

(B) The Secretary of the Interior.

(C) The Secretary of Agriculture.

(D) The Administrator of the Environmental Protection Agency.

(E) The Administrator of the Energy Research and Development Administration.

(F) The Commissioner of Food and Drugs.

(G) The Administrator of the Small Business Administration.

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(H) The Chief of Engineers.

(I) The chief executive officer of any other Federal agency and any Regional Fishery Management Council which the Secretary finds to have significant functions which relate, or may relate, to the development of aquaculture.

(2) The functions of the Committee shall be—

(A) to ensure that there is a continuing exchange of information among the agencies represented on the Committee with respect to the nature and status of the programs or projects being carried out by such agencies which relate, or which may relate, to aquaculture in general or to the implementation of the plan; and

(B) to review on a continuing basis the relevant programs and projects of all Federal agencies to determine whether they are being carried out in compliance with subsection (b).

(b) Each Federal agency which has any function or responsibility with respect to aquaculture or has jurisdiction over any activity which affects, or may affect, the achievement of the purposes of this Act, shall, in consultation with the Secretary and to the maximum extent practicable, carry out such function, responsibility, and activity in a manner which is consistent with the purposes of this Act.

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(c) Nothing in this Act shall be construed to amend, repeal, or otherwise modify the authority of any Federal officer or any Federal agency to carry out any functions relating to aquaculture which are authorized under any other provision of law.

SEC. 7. CONTRACTS AND GRANTS.

(a) The Secretary may carry out any function under this Act, and the Secretary of the Interior or the Secretary of Agriculture may carry out any function relating to any aquaculture development program which he is specified to implement under the plan, through grants to, or contracts with, any other Federal agency, any agency of any State and, subject to the approval of the State, any agency of any political subdivision thereof, any regional commission, any educational institution, or any other person.

(b) Any contract entered into, or any grant made, pursuant to this section shall contain such conditions and limitations as the Secretary concerned shall by regulation prescribe as being necessary and appropriate to protect the interests of the United States; except that no contract may be entered into, and no grant may be made, pursuant to this section unless the applicant submits with his application therefor a certification from each appropriate State agency and each appropriate local government agency stating that

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nothing in the laws administered by such agency prevents the carrying out of the project to which the contract or grant will be applied.

(c) The amount of any grant made pursuant to this section may not exceed one-half the estimated cost of the project for which the grant is made.

(d) Any person who receives a grant or contract under this section shall make available to the Secretary concerned and to the Comptroller General of the United States, or any of their authorized representatives, for purposes of audit and examination, any book, document, paper, and record that is pertinent to the funds received by such person under such grant or contract.

SEC. 8. GUARANTEES OF OBLIGATIONS ISSUED FOR AQUACULTURE FACILITIES.

(a) (1) The Secretary may, subject to the provisions of this section, guarantee, or make a commitment to guarantee, the payment of interest on, and the principal amount of, any obligation issued by an obligor for any of the following purposes:

(A) The financing of the construction, reconstruction, or reconditioning of any aquaculture facility (including the financing of the purchase cost of any aquaculture facility to be reconstructed or reconditioned); except that no obligation may be guaranteed

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under this section later than 2 years after the date of the completion of the construction, reconstruction, or reconditioning of the aquaculture facility involved.

(B) The acquisition of stocks of aquatic species for any aquaculture facility.

(C) The financing of the initial operating expenses of any aquaculture facility.

(D) The financing of marketing operations exclusively for aquaculture products.

(E) The refinancing of any existing obligation issued for any of the purposes specified in subparagraph (A), (B), (C), or (D), whether or not guaranteed under this section, including, but not limited to, any short-term obligation incurred for the purpose of obtaining temporary funds for refinancing.

Guarantees and commitments to guarantee may be made under this section without regard to section 3679 (a) of the Revised Statutes of the United States (31 U.S.C. 665 (a)).

(2) The full faith and credit of the United States is pledged to the payment of all guarantees made under this section with respect to both principal and interest, including any interest, if provided for in the guarantee, which may accrue between the date of default under a guaranteed obligation and the payment in full of the guarantee.

(3) Any guarantee, or commitment to guarantee, made

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by the Secretary under this section shall be conclusive evidence of the eligibility of the obligation for such guarantee, and the validity of any guarantee, or commitment of guarantee, so made shall be incontestable.

(4) The aggregate unpaid principal amount of all obligations guaranteed under this section and outstanding at any one time shall not exceed $500,000,000.

(b) (1) Obligations guaranteed under this section—

(A) shall have an obligor approved by the Secretary as being responsible and possessing the ability, experience, financial resources, and other qualifications necessary for the adequate operation and maintenance of the aquaculture facilities;

(B) shall be in an aggregate principal amount which does not exceed 87½ percent of the actual cost involved or the depreciated actual cost, as determined by the Secretary;

(C) shall have maturity dates satisfactory to the Secretary, but not to exceed 25 years;

(D) shall provide for payments by the obligor satisfactory to the Secretary; and

(E) shall bear interest (exclusive of charges for the guarantee and service charges, if any) at rates not to exceed such percentage per annum on the unpaid principal as the Secretary determines to be reasonable, tak-

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ing into account the range of interest rates prevailing in the private market for similar loans and the risks assumed by the Secretary.

(2) In guaranteeing any obligation under this section, the Secretary shall give preference to any person with 40 or fewer employees which, together with its affiliates, is primarily engaged in the business of aquaculture or commercial fishing for aquatic species.

(3) No obligation shall be guaranteed under this section unless the obligor conveys or agrees to convey to the Secretary such security interest as the Secretary may require to reasonably protect the interests of the United States.

(c) (1) The Secretary may charge a fee for any obligation guaranteed under this section, the amount of which shall be established by the Secretary by regulation but which may not exceed one-half of 1 percent per annum of the outstanding principal balance of the obligation. Fee payments shall be made by the obligor to the Secretary when moneys are first advanced under a guaranteed obligation and at least 60 days before each anniversary date thereafter.

(2) The Secretary shall charge and collect from the obligor such amounts as he may deem reasonable for the investigation of the application for any guarantee, for the ap-

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praisal of properties offered as security for any guarantee, and for the inspection of such properties during construction, reconstruction, or reconditioning; except that such charges shall not aggregate more than one-half of 1 percent of the original principal amount of the obligation to be guaranteed.

(3) All fees and other amounts received by the Secretary under the provisions of this subsection shall be deposited in the Fund.

(4) Obligations guaranteed under this section, and agreements relating thereto, shall contain such other provisions with respect to the protection of the security interests of the United States (including acceleration and subrogation provisions and the issuance of notes by the obligor to the Secretary), liens and releases of liens, payments of taxes, and such other matters as the Secretary may prescribe.

(d) (1) In the event of a default, which has continued for 30 days, in any payment by the obligor of principal or interest due under any obligation guaranteed under this section, the obligee or his agent shall have the right to demand, at or before the expiration of such period as may be specified in the guarantee or related agreements, but not later than 90 days from the date of such default, payment by the Secretary of the unpaid principal amount of said obligation and of the unpaid interest thereon to the date

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of payment. Within such period as may be specified in the guarantee or related agreements, but not later than 30 days from the date of such demand, the Secretary shall promptly pay to the obligee or his agent the unpaid principal amount of the obligation and unpaid interest thereon to the date of payment; except that the Secretary shall not be required to make such payment if before the expiration of such period he finds that there was no default by the obligor in the payment of principal or interest or that such default has been remedied before any such demand.

(2) Payments required to be made by the Secretary under paragraph (1) shall be made by the Secretary from the Fund.

(3) In the event of any payment by the Secretary under paragraph (1), the Secretary shall have all rights in any security held by him relating to his guarantee of such obligations as are conferred upon him under any security agreement with the obligor. Notwithstanding any other provision of law relating to the acquisition, handling, or disposal of property by the United States, the Secretary may, under such terms and conditions as the Secretary prescribes or approves, complete, recondition, reconstruct, renovate, repair, maintain, operate, or sell any property acquired by him pursuant to a security agreement with the obligor.

(4) After any default referred to in paragraph (1),

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the Secretary shall take such action against the obligor or any other parties liable thereunder that, in his discretion, may be required to protect the interests of the United States. Any suit may be brought in the name of the United States or in the name of the obligee and the obligee shall make available to the United States all records and evidence necessary to prosecute any such suit. The Secretary may accept a conveyance of title to and possession of property from the obligor or other parties liable to the Secretary and may purchase the property for an amount not greater than the unpaid principal amount of such obligation and interest thereon. In the event the Secretary receives through the sale of property an amount of cash in excess of any payment made to an obligee under paragraph (1) and the expenses of collection of such amounts, he shall pay such excess to the obligor.

(5) Whoever, for the purpose of obtaining any loan or advance of credit from any person with the intent that an obligation relating to such loan or advance of credit shall be offered to or accepted by the Secretary to be guaranteed, or for the purpose of obtaining any extension or renewal of any loan, advance of credit, or mortgage relating to an obligation guaranteed by the Secretary, or the acceptance, release, or substitution of any security on such a loan, ad-

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vance of credit, or for the purpose of influencing in any way the action of the Secretary under this section, makes, passes, utters, or publishes, or causes to be made, passed, uttered, or published any statement, knowing the same to be false, or alters, forges, or counterfeits, or causes or procures to be altered, forged, or counterfeited, any instrument, paper, or document, or utters, publishes, or passes as true, or causes to be uttered, published, or passed as true, any instrument, paper, or document, knowing it to have been altered, forged, or counterfeited, or willfully overvalues any security, asset, or income shall be punished by a fine of not more than $5,000, or by imprisonment for not more than 2 years, or both.

(e) The Secretary shall promulgate such rules and regulations as may be deemed necessary or appropriate to carry out the purposes and provisions of this section.

(f) For purposes of this section—

(1) The term "actual cost" of an aquaculture facility, as of any specified date, means the aggregate, as determined by the Secretary, of—

(A) all amounts paid by, or for the account of, the obligor with respect to such facility on or before that date; and

(B) all amounts which the obligor is then obli-

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gated to pay from time to time thereafter, for the construction, reconstruction, or reconditioning of such facility.

(2) The terms "construction", "reconstruction", or "reconditioning" include, but are not limited to, designing, inspecting, outfitting, and equipping of the aquaculture facility involved.

(3) The term "depreciated actual cost" means the actual cost depreciated on a straightline basis over the useful life of the property involved as determined by the Secretary.

(4) The term "obligation" means any note, bond, debenture, or other evidence of indebtedness issued for one of the purposes specified in subsection (a).

(5) The term "obligee" means the holder of any obligation.

(6) The term "obligor" means any person primarily liable for payment of the principal of or interest on any obligation.

SEC. 9. DISASTER LOANS.

(a) (1) The Secretary may make one or more loans from the Fund to any person if—

(A) an aquaculture facility, or stock of aquatic species at the facility, or both, that is owned by such

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person is damaged or destroyed as a result of a natural disaster; or

(B) the stock of aquatic species at an aquaculture facility owned by such person is damaged or destroyed by disease, pollution, or contamination (caused by reasons other than a natural disaster or the willful or negligent action of such person).

The purpose of any loan made by the Secretary under this section shall be to accomplish one or more of the following objectives:

(i) The repair, rehabilitation, or replacement of such facility.

(ii) The replacement of aquatic species stock.

(iii) To continue aquaculture operations while any such repair, rehabilitation, or replacement is in progress.

(iv) The purchase, construction, or reconstruction of an aquaculture facility at another location if the Secretary finds that—

(I) the damage to the facility is so extensive that its repair or rehabilitation is impracticable;

(II) the replacement of the destroyed facility at the same location is impracticable; or

(III) the pollution or contamination referred to in subparagraph (B) is likely to persist for such

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period of time that continued aquaculture operations at the same location are impracticable.

(v) To meet payments of principal and interest on any obligation of such person with respect to the facility or stock so damaged or destroyed for such period of time as the Secretary deems appropriate, taking into account the degree of such damage or destruction.

(vi) To retire in full any such obligation.

(2) No loan may be made under this section for any damage or destruction—

(A) which is fully compensated for by insurance (including insurance paid under section 10) or otherwise; or

(B) for which assistance is available under any other Federal disaster assistance program.

(b) Any loan made pursuant to this section shall—

(1) mature in not more than 20 years;

(2) bear interest at a rate not less than the rate determined by the Secretary of the Treasury taking into consideration the average market yield on outstanding Treasury obligations of comparable maturity;

(3) be approved only upon the furnishing of such security or other reasonable assurance of repayment as the Secretary may require; and

(4) be subject to such other terms and conditions

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as the Secretary may require to protect the interests of the United States.

(c) The Secretary may consent to the modification of any term or condition of any loan made under this section, including, but not limited to, reduction of the rate of interest, deferment of any installment of principal or interest, or change in any security requirement.

(d) All payments of principal and interest on loans made under this section shall be deposited into the Fund.

(e) For purposes of this section, the term "obligation" means any note, bond, debenture, or other evidence of indebtedness issued for the purpose of financing (1) the construction, reconstruction, or reconditioning of an aquaculture facility, (2) the initial operating expenses of any such facility, and (3) the acquisition of stock of aquatic species for any such facility.

(f) (1) Whoever makes any statement knowing it to be false, or whoever willfully overvalues any security for the purpose of obtaining for himself or for any applicant any loan under this section, or extension thereof by renewal, deferment of action, or otherwise, or the acceptance, release, or substitution of security therefor, or for the purpose of influencing in any way the action of the Secretary under this section, or for the purpose of obtaining money, property, or anything of value under this section, shall be punished by a

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fine of not more than $5,000, or by imprisonment for not more than 2 years, or both.

(2) Whoever, with the intent to defraud, knowingly conceals, removes, disposes of, or converts to his own use or to that of another, any property mortgaged or pledged to, or held by, the Secretary pursuant to this section shall be punished by a fine of not more than $5,000, or by imprisonment for not more than 5 years, or both.

(g) No loan may be made by the Secretary under this section for any damage to, or destruction of, any aquaculture facility or stock of aquatic species which occurs on or after the close of the 5-year period beginning on the effective date of this Act.

SEC. 10. INSURANCE AGAINST CERTAIN LOSSES INCURRED IN AQUACULTURE FACILITY OPERATIONS.

(a) As used in this section, unless the context otherwise requires—

(1) The term "direct insurance" means any insurance described in paragraphs (2), (3), and (4).

(2) The term "essential liability insurance" means insurance against all sums which the owner of an aquaculture facility becomes legally obligated to pay as damages because of bodily injury or property damage caused

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by the aquaculture facility, the operation of such facility, or the aquatic species cultured at such facility.

(3) The term "essential property insurance" means insurance against direct loss of, or direct damage to, the real or personal property of an aquaculture facility caused by perils as they are defined and limited in standard fire policies and extended coverage endorsements thereon as approved by the State insurance authority, and insurance against loss of, or damage to, the real or personal property of an aquaculture facility from such perils as the Secretary by regulation shall specify, including, but not limited to vandalism, malicious mischief, burglary, and theft.

(4) The term "essential stock insurance" means insurance against loss of, or damage to, any aquatic species being cultured at an aquaculture facility due to unavoidable or natural causes, including, but not limited to, drought, pollution, hail, frost, wind, winterkill, freeze, lightning, fire, excessive rain, flood, snow, wildlife, hurricane, tornado, insect or parasite infestation, disease, and such other unavoidable or natural causes as the Secretary by regulation shall specify.

(5) The term "insurer" includes any insurance company or group of companies under common owner-

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ship which is authorized to engage in the insurance business under the laws of any State.

(6) The term "owner" means any person having an insurable interest in an aquaculture facility or aquatic species stock.

(7) The term "pool" means any pool or association of insurers in any State which is formed, associated, or otherwise created for the purpose of making insurance more readily available.

(8) The term "reasonable premium rate" means that premium rate determined by the Secretary, which would permit the purchase of any direct insurance coverage by a reasonably prudent person in similar circumstances with due regard to the costs and benefits involved.

(b) The Secretary may by regulation define any technical or trade term necessary in the administration of this section, insofar as any such definition is not inconsistent with the provisions of this section.

(c) (1) The Secretary shall conduct, within 6 months after the effective date of this Act, and annually thereafter, a study to determine whether direct insurance is generally available to owners at reasonable premium rates, through insurers, pools, or a suitable program adopted under State law.

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(2) (A) If the Secretary finds, as a result of the study referred to in paragraph (1), that essential property insurance or essential liability insurance is not available at reasonable premium rates in any State and such insurance has not been provided by State action, the Secretary may establish a program to provide such insurance in such State, if the Secretary considers the issuance of such insurance necessary and appropriate to carry out the purposes and policy of this Act.

(B) Any essential property insurance or essential liability insurance issued by the Secretary under this paragraph shall be subject to such terms and conditions, and to such deductibles and other restrictions and limitations as the Secretary deems appropriate; except that the Secretary may not provide essential property insurance or essential liability insurance with respect to—

(i) any aquaculture facility or stock of aquatic species which the Secretary determines to be uninsurable due to the failure of the owner to follow established principles for operating aquaculture facilities or culturing aquatic species, as the case may be; or

(ii) any aquaculture facility which the Secretary determines to lack reasonable protective measures to prevent loss or damage.

(3) (A) If the Secretary finds, as a result of the study

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referred to in paragraph (1), that essential stock insurance is not available at reasonable premium rates in any State and that such insurance has not been provided by State action, the Secretary shall establish a program to provide such insurance in such State.

(B) Any essential stock insurance issued by the Secretary under this paragraph shall be subject to such terms and conditions and to such deductibles and other restrictions and limitations as the Secretary deems appropriate; except that the Secretary may not provide essential stock insurance with respect to any stock of aquatic species if the Secretary determines such stock to be uninsurable due to the failure of the owner to follow established principles for culturing aquatic species or due to the lack of reasonable protective measures at the aquaculture facility concerned to prevent the loss of, or damage to, the stock being cultured.

(d) (1) In determining the premium rate for any direct insurance offered from time to time under subsection (c) (2) or (3), the Secretary shall consult with persons knowledgeable and experienced in insurance, including, but not limited to, State insurance regulatory authorities, and may take into consideration with respect to the insurance concerned, the nature and degree of risk involved, the protective devices employed, the extent of past and anticipated losses, the prevailing rate for similar coverages, the economic im-

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portance of the insurance, and the relative abilities of the particular classes and types of insureds to pay the actual premium for such coverage.

(2) (A) The Secretary may not establish the premium rate for any direct insurance at less than 50 percent of the actual premium rate for such insurance.

(B) For purposes of subparagraph (A), the actual premium rate for any direct insurance offered under this section shall be determined as follows:

(i) If insurance of the same kind is generally offered by insurers or pools in the State concerned, the actual premium rate shall be that rate which the Secretary determines to be the median premium rate for all such insurance so offered.

(ii) If insurance of the same kind is not generally offered by insurers or pools in the State concerned, the actual premium rate shall be that rate which the Secretary determines to be the rate at which insurers or pools in such State would offer such insurance, taking into account actuarially sound principles applicable to the elements making up such rate, including, but not limited to, claim losses, general administrative expenses, acquisition expenses, taxes, license fees, and profits.

In making determinations under clauses (i) and (ii), the Secretary shall consult with the insurance regulatory author-

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ity of the State concerned and any rate advisory organization licensed by such State.

(3) Nothing in this section shall be construed to prohibit or require either the adoption of uniform national rates or the periodic modification of the currently estimated reasonable premium rates for any particular coverage, class, State, or risk on the basis of additional information or actual loss experience.

(e) (1) The Secretary may enter into any contract, agreement, treaty, or other arrangement with any insurer or pool to provide reinsurance coverage with respect to any direct insurance issued by such insurer or pool, in consideration of payment of such premiums, fees, or other charges by insurers or pools which the Secretary deems to be appropriate, after consultation with persons knowledgeable and experienced in insurance.

(2) Reinsurance issued under this subsection shall reimburse an insurer or pool for its total proved and approved claims for covered losses resulting from providing the direct insurance concerned during the term of the reinsurance contract, agreement, treaty, or other arrangement, over and above the amount of the insurer's or pool's retention of such losses, as provided in such reinsurance, contract, agreement, treaty, or other arrangement entered into under this section.

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rangements may be made without regard to (a) of the Revised Statutes of the United States (31 U.S.C. 665 (a)), and shall include any terms and conditions which the Secretary deems necessary to carry out the purposes of this section. The premium rates and terms and conditions of such contracts, agreements, treaties, or other arrangements with an insurer or pool shall be uniform in any one year throughout the country.

(f) (1) All premiums received by the Secretary under this section shall be deposited into the Fund.

(2) The Secretary, in a suit brought in the appropriate United States district court, shall be entitled to recover from any owner, insurer, or pool the amount of any unpaid premium lawfully payable to the Secretary by such owner, insurer, or pool under any direct insurance or reinsurance issued under this section.

(3) No action or proceeding shall be brought for the recovery of any premium due the Secretary, or for the recovery of any premium paid to the Secretary in excess of the amount due, unless such action or proceeding is commenced within 5 years after the right accrued for which the claim is made; except that, if the insurer has made or filed with the Secretary a false or fraudulent statement or

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other document with intent to evade, in whole or in part, the payment of premiums, the claim shall not be deemed to have accrued until its discovery by the Secretary.

(g) In order to provide for maximum efficiency in the administration of the insurance and reinsurance program provided under this section, and in order to facilitate the expeditious payment of any claims under such program, the Secretary may enter into contracts with any insurer, pool, or person, for the purpose of providing for the performance of any of the following functions:

(1) The estimation or determination of any amounts of payments for reinsurance or direct insurance claims.

(2) The receipt, disbursement, and accounting for funds in making payments for reinsurance and direct insurance claims.

(3) The auditing of the records of any insurer, pool, or person to the extent necessary to assure that proper payments are made.

(4) The establishment of the basis of liability for reinsurance or direct insurance payments, including the total amount of proved and approved claims which may be payable to any insurer, pool, or owner, and the total amount of premiums earned by any insurer or pool in the respective States from direct insurance or reinsurance.

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(5) The provision of assistance in any manner provided for in the contract to further the purposes of this section.

(h) The Secretary may, with the consent of the agency concerned, accept and utilize, on a reimbursable basis, the officers, employees, services, facilities, and information of any Federal agency with respect to any insurance matter which is within the purview of this section.

(i) The Secretary may prescribe regulations establishing the general method or methods by which proved and approved claims for losses are paid under any direct insurance or reinsurance issued under this section. Proved and approved claims shall be paid from the Fund.

(j) The Secretary, in providing any direct insurance or reinsurance under this section may adjust and pay all claims for proved and approved losses covered by such insurance and, upon the disallowance by the Secretary, or upon the refusal of the claimant to accept the amount allowed upon any such claim, the claimant, within one year after the date of mailing of notice of disallowance or partial disallowance of the claim, may institute an action on such claim against the Secretary in the United States district court for the district in which the insured owner or reinsured insurer or pool resides or principally conducts business, and jurisdiction is

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hereby conferred upon such court to hear and determine such action without regard to the amount in controversy.

(k) The face amount of direct insurance and reinsurance coverage outstanding and in force at any one time under this section shall not exceed $1,000,000,000.

(l) No direct insurance or reinsurance may be issued by the Secretary under this section after the close of the 5-year period beginning on the effective date of this Act.

SEC. 11. FEDERAL AQUACULTURE ASSISTANCE FUND.

(a) There is established in the Treasury of the United States a Federal Aquaculture Assistance Fund. The Fund shall be available to the Secretary as a revolving fund for the purpose of carrying out, and administering, sections 8, 9, and 10. The Fund shall consist of—

(1) any sums appropriated to the Fund;

(2) any fees received by the Secretary in connection with any guarantee made under section 8;

(3) recoveries and receipts received by the Secretary under security, subrogation, and other rights and authorities under sections 8, 9, and 10;

(4) payments of principal and interest received by the Secretary under any loan made under section 9;

(5) premiums paid to, or recovered by, the Secretary for any direct insurance or reinsurance issued by the Secretary under section 10; and

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(6) moneys deposited pursuant to the last sentence of subsection (b).

All payments made by the Secretary to carry out the provisions of sections 8, 9, and 10 (including reimbursements to other Government accounts) shall be paid from the Fund, only to the extent provided in appropriation Acts. Sums in the Fund which are not currently needed for the purposes of sections 8, 9, and 10 shall be kept on deposit or invested in obligations of, or guaranteed by, the United States.

(b) If at any time the moneys in the Fund are not sufficient to pay any amount the Secretary is obligated to pay under section 8(d)(1) or any direct insurance or reinsurance claim under section 10, the Secretary shall issue to the Secretary of the Treasury notes or other obligations (only to such extent and in such amounts as may be provided for in appropriation Acts) in such forms and denominations, bearing such maturities, and subject to such terms and conditions as the Secretary of the Treasury prescribes. Such notes or other obligations shall bear interest at a rate determined by the Secretary of the Treasury, taking into consideration the current average market yield on outstanding marketable obligations of the United States of comparable maturities during the month preceding the issuance of such notes or other obligations. The Secretary of the Treasury

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shall purchase any notes and other obligations to be issued hereunder and for such purpose he may use as a public debt transaction the proceeds from the sale of any securities issued under the Second Liberty Bond Act, as amended, and the purposes for which securities may be issued under such Act, as amended, are extended to include any purchases of such notes and obligations. The Secretary of the Treasury at any time may sell any of the notes or other obligations acquired by him under this subsection. All redemptions, purchases, and sales by the Secretary of the Treasury of such notes or other obligations shall be treated as public debt transactions of the United States. Moneys borrowed under this subsection shall be deposited in the Fund and redemptions of such notes and obligations shall be made by the Secretary from the Fund.

SEC. 12. REPORT AND RECOMMENDATIONS.

Before the close of the 90th day after the close of the 3-year period beginning on the effective date of this Act, the Secretary shall review the operation and effectiveness of the disaster loan program provided for under section 9 and the insurance program provided for under section 10 and shall submit a report thereon to the Congress, together with the recommendation of the Secretary as to whether or not either such program should be continued and, if the Secretary recommends continuation, such suggestions as the Secretary may

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have for improving the operation and effectiveness of such program.

SEC. 13. AUTHORIZATION OF APPROPRIATIONS.

(a) For purposes of carrying out the provisions of this Act (other than sections 8, 9, or 10), there are authorized to be appropriated, notwithstanding any authorization for appropriations in any other Act in effect before the date of the enactment of this Act—

(1) to the Department of Commerce, not to exceed—

(A) $4,000,000 for the fiscal year 1979,

(B) $15,000,000 for the fiscal year 1980, and

(C) $17,000,000 for the fiscal year 1981;

(2) to the Department of the Interior, not to exceed—

(A) $2,000,000 for the fiscal year 1979,

(B) $7,500,000 for the fiscal year 1980, and

(C) $8,500,000 for the fiscal year 1981; and

(3) to the Department of Agriculture, not to exceed—

(A) $2,000,000 for the fiscal year 1979,

(B) $7,500,000 for the fiscal year 1980, and

(C) $8,500,000 for the fiscal year 1981.

(b) There are authorized to be appropriated, without fiscal year limitation, to the Fund such sums as may be

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necessary and appropriate for purposes of carrying out sections 8, 9, and 10; but not to exceed $500,000,000 for the purposes of section 8 and not to exceed $250,000,000 for the purposes of section 9.

SEC. 14. EFFECTIVE DATE.

This Act shall take effect October 1, 1978.

Passed the House of Representatives February 15, 1978.

Attest: EDMUND L. HENSHAW, JR.,
Clerk.

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COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, D.C., April 13, 1978.

Hon. HOWARD W. CANNON,
Chairman, Committee on Commerce, Science, and Transportation,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Your letter dated March 2, 1978, requested our comments on S. 2582, 95th Congress, which, if enacted, would be cited as the "National Aquaculture Organic Act." A generally similar bill, H.R. 9370, was passed by the House of Representatives on February 15, 1978.

The purpose of both S. 2582 and H.R. 9370 is to promote aquaculture in the United States by (1) declaring a national aquaculture policy; (2) establishing and implementing a national plan for aquaculture; and (3) developing programs and encouraging activities which will result in the coordination of domestic aquaculture efforts, the conservation and increased availability of fisheries resources, the creation of new industries and job opportunities, and other national benefits.

Section 7(b) of each bill would authorize the Secretary to prescribe regulations relating to contracts and grants and section 7(d) of each bill would require any person who receives a grant or contract to make available to the Secretary and to the Comptroller General of the United States, or any of their authorized representatives, for purposes of audit and examination, any book, document, paper, and record that is pertinent to the funds received under such grant or contract.

We believe these provisions could result in future audit and/or access to records problems because section 7(b) does not specify the types of records that recipients should maintain and section 7(d) is not clear as to who would make the determination whether books, documents, paper, and records are related to the grants or contracts. We believe adequate provisions relating to maintenance and access to rceords also should be included with respect to the financial assistance authorized under sections 8, 9, and 10 of both bills and section 11 of H.R. 9370. To avoid repetition in each section, we suggest that section 7(d of S. 2582 be deleted and that a new section reading essentially as follows be added.

"Sec. (a) Each recipient of Federal assistance under this Act, pursuant to grants, subgrants, contracts, subcontracts, loans or other arrangements, entered into under other than by formal advertising, and which are otherwise authorized by this Act shall keep such records as the Secretary shall prescribe, including records which fully disclose the amount and disposition by such recipient of the proceeds of such assistance, the total cost of the project or undertaking in connection with which such assistance is given or used, the amount of that portion of the cost of the project or undertaking supplied by other sources, and such other records as will facilitate an effective audit.

"(b) The Secretary and the Comptroller General of the United States, or any of their duly authorized representatives, shall, until the expiration of three years after completion of the project or undertaking referred to in subsection (a) of this section, have access for the purpose of audit and examination to any books, documents, papers and records of such recipients which in the opinion of the Secretary or the Comptroller General may be related or pertinent to the grants, contracts, subcontracts, subgrants, loans or other arrangements referred to in subsection (a)."

Sincerely yours,

R. F. KELLER,
Deputy Comptroller General, of the United States.

DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D.C., May 17, 1978.

Hon. HOWARD W. CANNON,
Chairman, Committee on Commerce, Science, and Transportation, U.S. Senate,
Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your request of March 2, for a report on S. 2582 a bill "To provide for the development of aquaculture in the United States, and for other purposes."

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The Department of Agriculture recommends that the bill not be enacted.

The bill provides for a national program designed to promote aquaculture development which will result in increased sources of protein for human consumption. It also provides for developing, improving, or maintaining fishery resources for both recreational and commercial purposes as well as stimulating aquaculture related business, industry, and employment.

The bill authorizes the Secretary of Commerce to establish a National Aquaculture Development Plan which would identify aquaculture needs and implement a program to promote aquaculture development. Authorization of appropriations is provided to the Department of Commerce for carrying out the provisions of this bill.

The Department opposes this legislation because authority currently exists within USDA to accomplish the primary purposes of this bill. The Department has historically exercised its authority in providing services to fish farmers as it has to those involved with other farming enterprises. The Department's interest in aquaculture is supported by the enactment of the Food and Agriculture Act of 1977 (Public Law 95–113) which authorized the Department to have a lead role in supporting food and agricultural sciences; including aquaculture. The Department of Agriculture has been instrumental in helping freshwater fish farming achieve its current success. A summary of the USDA past and ongoing efforts in aquaculture is included in an enclosure.

The Department of Agriculture believes the production of fish and other aquatic species under controlled conditions for commercial purposes in farm-owned or farm-operated ponds is an agricultural enterprise. This enterprise is directly comparable in scope, effect, and result to other time-honored agricultural enterprises such as the raising of livestock or crops. The Department of Agriculture has the staff, experience, and organization to carry out the necessary aquaculture support services and linkages at State and county levels.

Title XIV, the "National Agricultural Research, Extension and Teaching Policy Act of 1977" of the "Food and Agricultural Act of 1977" (Public Law 95–113) authorized the Department of Agriculture to expand its aquaculture support programs. Title XIV states, "The Department of Agriculture is designated as the lead agency of the Federal Government for agricultural research . . . extension, and teaching in the food and agricultural sciences . . . sciences related to food and agriculture in the broadest sense, including the social, economic, and political considerations of . . . aquaculture" (sec. 1404 and 1405). Title XV of Public Law 95–113 also includes aquaculture, in addition to agriculture, rural development, and human nutrition, as a basic function of the Department (sec. 1502(a)). Title XV of Public Law 95–113 includes loan authority for aquacultural purposes as a function of the Department by amending title III of the Bankhead-Jones Farm Tenant Act and subtitle A of the Consolidated Farm and Rural Development Act (sec. 1503).

Since 1976, USDA has increased its emphasis on aquaculture to give it a higher profile within the Department. A USDA interagency work group was established in January 1976 composed of personnel from 11 USDA agencies. The work group has been active since its inception to make the Department responsive to and involved with the aquaculture industry. USDA personnel have actively participated in an interdepartmental committee on aquaculture to coordinate aquacultural efforts at the Federal and non-Federal levels, to avoid duplication with other agencies and to assure optimum Federal involvement to the aquaculture industry. A USDA Aquaculture Coordinator was hired in February 1978 to provide leadership, coordinate aquaculture activities, and develop plans and procedures which would enable the Department to give appropriate consideration to the needs of aquaculture.

In view of the Department's historical support of aquaculture, the new USDA authority for aquaculture under Public Law 95–113, and the increased recent activity of USDA to promote aquaculture development, the Department opposes this legislation.

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration.

Sincerely,

CAROL TUCKER FOREMAN,
Acting Secretary.

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DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D.C., May 26, 1978.

Hon. HOWARD W. CANNON,
Chairman, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your request of April 4, for a report on S. 2762 a bill "To provide for the development of aquaculture in the United States, and for other purposes."

The Department of Agriculture recommends that the bill not be enacted.

The bill provides for a national program designed to promote aquaculture development which will result in increased sources of protein for human consumption. It also provides for developing, improving, or maintaining fishery resources for both recreational and commercial purposes as well as stimulating aquaculture related business, industry, and employment.

The bill authorizes the Secretary of Commerce to establish a National Aquaculture Development Plan which would identify aquaculture needs and implement a program to promote aquaculture development. The plan would be developed in consultation with the Secretaries of Interior and Agriculture, who would also assist the Secretary of Commerce in implementing the program. The bill provides for disaster loans and direct insurance to aquaculturists and authorizes appropriations for fiscal years 1979, 1980, and 1981 to the Departments of Commerce, Interior, and Agriculture for carrying out the provisions of this bill.

The Department opposes this legislation because authority currently exists within USDA to accomplish the primary purposes of this bill. The Department has historically exercised its authority in providing services to fish farmers as it has to those involved with other farming enterprises. The Department's interest in aquaculture is supported by the enactment of the Food and Agriculture Act of 1977 (Public Law 95–113) which authorized the Department to have a lead role in supporting food and agricultural sciences; including aquaculture. The Department of Agriculture has been instrumental in helping freshwater fish farming achieve its current success. A summary of the USDA past and ongoing efforts in aquaculture is included in an enclosure.

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procedures which would enable the Department to give appropriate consideration to the needs of aquaculture.

In view of the Department's historical support of aquaculture, the new USDA authority for aquaculture under Public Law 95–113, and the increased recent activity of USDA to promote aquaculture development, the Department opposes this legislation.

The Office of Management and Budget has advised that there is no objection to the presentation of this report from the standpoint of the administration.

Sincerely,

CAROL TUCKER FOREMAN,
Acting Secretary.

Enclosure.

ENCLOSURE TO LEGISLATIVE REPORT ON S. 2762

The following is the detailed explanation of U.S. Department of Agriculture agency roles in aquaculture.

SOIL CONSERVATION SERVICE (SCS)

With field offices in nearly all counties in the United States, the Soil Conservation Service is able to work directly with land owners and operators whose desires and farm resources indicate a satisfactory opportunity for some aspect of aquaculture.

The Soil Conservation Service assists the would-be aquaculturist to assess the potential of his resources for growing and marketing his product and to match his resources with the right kind of enterprise. Assistance is primarily with freshwater fish farming.

Assessment of resources included: (1) Water quality (field testing), (2) water quantity, (3) general soils information, (4) market potential (general), (5) human resources, and (6) financial resources.

The small percentage of survivors of this initial resource appraisal (estimated to be less than 5 percent) then are given detailed assistance in developing a resource conservation plan considering: (1) Water quality (monitoring and laboratory), (2) water quantity (monitoring and measuring), (3) cost-return analysis (breakeven point), (4) fish habitat management, (5) specific soils information. (6) site limitations (physical), and (7) design and layout.

Where FmHA financing is involved, the SCS may be requested to inspect construction as it proceeds.

SCS technicians usually do not aid in day-to-day management of the operating facilities. They do occasionally assess specific problems that may develop such as oxygen deficiencies and bank erosion and provide fish farmers new research results and results of experience gained by others. The matter of diagnosis and treatment of diseases is specifically against SCS policy. The cooperator is referred to other agencies or private consultants for assitance with those problems.

In fiscal year 1976, the SCS provided technical assistance with fish management on 44,901 ponds, 2,376 acres of commercial fish ponds, and 13,235 feet of fish raceways.

SCIENCE AND EDUCATION ADMINISTRATION—EXTENSION (SEA–E)

The Science and Education Administration—Extension (SEA–E), as the educational arm of the Department of Agriculture, is charged under the Smith-Lever Act "to aid in the diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same." The act further provides that "this work shall be carried out in such manners as may be mutually agreed upon by the Secretary of Agriculture and the State agricultural college or colleges . . . receiving the benefit of this act."

Thus, using research information provided by the State Experiment Stations and other research agencies, SEA–E has been actively engaged in fish pond management in 26 States; and added programs on marine resource education, the commercial fish industry, and the Sea Grant Program. In the freshwater area, activities include: Fish bait production (17 States), catfish farming (15 States), and trout farming (5 States). A demonstration project was initiated in 1976 by

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the Texas SEA–E to evaluate catfish production as a supplemental source of food and income for small and low income farmers.

Activities have been expanded in the marine areas since SEA–E negotiated a memorandum of understanding with the Sea Grant Program. In 20 States, SEA–E is carrying out educational programs under mutual agreement.

Recently, SEA–E personnel have been conducting educational programs on economics and management is aquatic animal harvesting, processing, storage, and marketing.

SCIENCE AND EDUCATION ADMINISTRATION—COOPERATIVE RESEARCH (SEA–CR)

The Science and Education Administration—Cooperative Research (SEA–CR) supports financial research on freshwater aquaculture at the State Agricultural Experiment Stations of Land-Grant Colleges. This involves 48 research projects having a total scientific manpower input of about 20 scientist-years. The combined total effort on all aquaculture projects at these State institutions was about 50 scientist-years in 1975.

Research is being conducted on several major aspects of freshwater aquaculture, including the breeding of aquaculture species for more efficient growth and more uniformity of product at harvesting; nutritional studies to define requirements for more efficient production of the various species; cultural methods for optimum production, such as water temperature and quality, stocking rates, harvesting methodology, raceway culture, and other practices for optimum production. Methods of disease and parasite control to reduce losses are being studied. Processing and marketing studies are in progress to improve product quality and nutritional value, product acceptability, and greater efficiency in processing and marketing aquaculture products.

The SEA–CR funds also support a Regional Research Project (S–83) entitled, "Freshwater Food Animals." Through this project, scientists can exchange unpublished research information, jointly plan future research activities, and avoid duplication of research. Nine State institutions and several Federal agencies (TVA, USDI, USDC, and USDA) participate in the project.

SCIENCE AND EDUCATION ADMINISTRATION—FEDERAL RESEARCH (SEA–FR)

The Science and Education Administration—Federal Research (SEA–FR) is not currently conducting research directly related to aquaculture. While the agency does have authority to conduct research in this area because of its responsibility for food production, current policy directs our research to terrestrial food production or agriculture due to resource limitations.

The SEA–FR does conduct research indirectly related to aquaculture. Such areas include the prevention of water quality degradation by pesticides, animal waste, and sedimentation from ag ricultural operations. The thrust, however, is not directed to aquacultural production.

This agency does have the capability for research many problems in the aquaculture field due to its expertise developed in answering many of the needs of agriculture. These areas would include hydrology (the management of run-off from watersheds) including development of ponds and hydraulics of structures such as dams, raceways, and channels including aeration of water.

In the area of aquacultural production, we could contribute to solving problems such as viral, bacterial, and fungal diseases, parasitology, and nutrition. Our marketing research expertise could also easily contribute to similar problem areas in aquaculture such as in the development of new methods and processes for preserving aquatic foods to maintain flavor.

Besides food processing, we have considerable experience in the transportation, storage, wholesaling, and retailing of products to reduce costs, to maintain quality, and reduce losses from waste spoilage. Additionally, we are concerned with problems associated with human health and safety to ensure that food and food products are free from toxic, potentially dangerous residues, harmful chemicals, micro-organisms and from naturally occurring toxins.

In summary—while SEA–FR is not researching the aquacultural field directly, it does have the capability for contributing to an aquacultural research program.

FARMERS HOME ADMINISTRATION (FMHA)

The Farmers Home Administration of the U.S. Department of Agriculture channels credit to farmers, rural residents, and communities. It helps borrowers gain maximum benefit from loans through counseling and technical assistance.

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Farmers and rural people have several credit programs they can call upon through FmHA to help purchase or operate farms, provide new employment and business opportunities, enhance environment, acquire homes, and upgrade the standard of living for all who wish to live in small towns or open country. Agency personnel are active on State and county committees involved with the improvement or development of local areas. They have learned the need for local ideas and initiative, for leadership from private individuals and local officials.

Some loan programs are strictly for individuals and their families. Some involve associations of people. Other loans are made to partnerships, corporations, or public bodies. FmHA employees work in concert with all types of borrowers as well as with State and local officials, planning groups, and Government agencies.

The agency's loan authorities provide a supplemental source of credit, augmenting the efforts of the private lenders rather than competing with them. Most FmHA programs require that a borrower "graduate" to commercial credit when able to do so. The nature of the agency's operation makes it possible for FmHA to increase the supply of rural credit by drawing money from the major finance center.

Major purposes of FmHA's rural credit programs include:

1. To help build the family farm system, the economic and social base of many rural communities.
2. To expand business and industry, increase income and employment, and control or abate pollution.
3. To install water and waste disposal systems and other community facilities that will help rural areas upgrade the quality of living and promote economic development and growth.
4. To provide or improve modest homes in suitable rural environments at prices and on terms that families of low or moderate income can afford.

Most of the loan programs fall into two categories:

Guaranteed loans, in which the loan is made and serviced by a private lender. FmHA guarantees to limit any loss to a specified percentage. Interest rates are determined between borrower and lender unless the rate is established by law.

Insured loans, that are originated, made, and serviced by the personnel of the agency. Notes are sold to investors, backed by the full faith of the Government, and the investor's money replenishes a revolving loan fund. For most programs, interest rates to borrowers are determined by the current cost of Federal borrowing, although some rates are established by statute.

Farmer loans

Borrower must be family-sized operator, living on and operating his farm, at least on a part-time basis. Among the purposes of which farmer ownership, soil and water, and operating loans may be made are hydroponic farming and the production of fish under controlled conditions for human consumption.

Emergency loans

Emergency loans are only made in counties where property damage or severe production losses have occurred as a result of a natural disaster and the area has been named as eligible for assistance.

Emergency loans are made to eligible farmers, ranchers, and aquaculture operators for losses, major adjustments, operating expenses, and other essential needs arising from natural disasters so that they may continue their operations and return to local sources of credit as soon as possible.

Aquaculture

This term as defined by Public Law 94-68 means the husbandry of aquatic organisms under a controlled or selected environment.

Aquatic organism planters—perform or actively manage the aquatic operations. Such operations must be conducted on the applicant's owned, leased, or permit grounds. Such grounds are grounds under water on which the planting operations are conducted. Other types of operations, such as contract operations, gathering such organisms, and harvesting those planted in public water, are not eligible for emergency loans unless these waters are identified and a permit is issued to the applicant. An applicant who performs the aquatic functions in connection with such operations owned by others (share operators), or is employed by others in any type of aquatic operation is not eligible.

Among the purposes for which emergency loans may be made are:

1. Production of water plants.
2. Operation of aquaculture farms or hydroponic farms.

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3. Production of aquatic organisms under a controlled or selected environment.
4. Production of fish under controlled conditions for human consumption.
5. Production of oysters under controlled conditions.

Business and industrial loans

Loans to promote development of business and industry, including aquaculture may be made for projects in cities and towns below 50,000 population, but not in larger cities or in areas adjacent to them where population density is more than 100 persons per square mile. Preference is given to applications for projects in open country, rural communities, and towns of 25,000 and smaller.

ANIMAL AND PLANT HEALTH INSPECTION SERVICE (ALPHIS)

The Animal and Plant Health Inspection Service (APHIS) consists of Veterinary Services and Plant Protection and Quarantine. Veterinary Services activities in aquaculture are as follows:

1. Provide differential diagnoses of infections and toxicological conditions of fish through our facilities at the Veterinary Services Laboratories, National Animal Disease Center, USDA, Ames, Iowa.
2. Provide consultation of field veterinary epidemiologists, on a request basis to local officials, and individual fish producers in the areas of infections and toxicological conditions.
3. Administration of the Virus-Serum-Toxin Act of 1973 which pertains to biological products developed for fish. Currently Enteric Redmouth Bacterin and Vibrio Anguillarum Bacterin are licensed.

ECONOMIC, STATISTICSS, AND COOPERATIVE SERVICE (ESCS)

The Economic, Statistics, and Cooperative Service (ESCS) responds to requests for information relating to the economics of aquaculture. The most active involvement of ESCS has been in conjunction with the Resource Conservation and Development (R.C. & D.) Program of the U.S. Department of Agriculture. Under that program, ESCS performs economic studies on typical problems encountered in the 178 R.C. & D. project areas in the United States. In addition, the National Economic Analysis Division of ESCS has conducted and maintains interest in marketing studies relating to aquaculture as an element of the consumer's food purchasing patterns. Although the last published ESCS study relating to the economics of aquaculture was released in May 1973, ESCS maintains an active interest and regularly responds to requests for information on the economics of aquaculture. ESCS is not currently, however, conducting research in the economics of aquaculture.

Senator MAGNUSON. The Senator from Alaska is here, and I would be glad if you'd lead off on this matter Mike.

STATEMENT OF HON. MIKE GRAVEL, U.S. SENATOR FROM ALASKA

Senator GRAVEL. Very good, Mr. Chairman. I think I can go through it quite briefly.

It's a little bit, Mr. Chairman, like carrying coals to Newcastle, testifying before you, since your record and accomplishment in the entire fisheries field has been monumental as far as this Nation is concerned. I wish that more Americans and the leadership of the Nation in the past had listened more frequently to you. But I'd like to just thank you for this opportunity, and would like to comment on the three pieces of legislation that are presently before you for consideration.

Aquaculture is practiced in varying degrees of intensity throughout the world. I believe it's time now to provide legislative encouragement for aquaculture activity in the United States. The world activity in aquaculture is wide and varied. China has been cultivating fish

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for over 2,000 years. Japan produces more than 10 percent of its seafood through aquaculture. And Russia has been giving it some serious thought.

The United States has been dabbling in various forms of aquaculture for considerable periods of time. The Library of Congress reports aquaculture in the United States has not grown significantly compared to other parts of the world. My home State of Alaska, which you're fairly familiar with, Mr. Chairman, has been involved in the cultivation of fin fish since the late 1950's. With more than 50 percent of the entire U.S. coastline located in Alaska, one can understand my great interest. The potential for marine aquaculture development within Alaska is truly incredible, not to mention the vast possibilities for future fresh water cultivation.

World fishery resources were once thought to be practically unlimited. This has been clearly shown not to be the case. World fisheries resources are now estimated by some experts to be capable of yielding a maximum global harvest of 100 to 150 million metric tons per year. More conservative estimates rarely exceed 100 million metric tons. Included in that is the NOAA administration estimate of 100 million metric tons, to be met by 1980. This suggests a world shortage of fish products is possible in the foreseeable future.

World per capita fish consumption has increased over the past several years. In the United States alone, it's risen to 12.9 pounds per person. Estimates would indicate that 15.2 pounds per American would be reached by the year 2000. The Library of Congress has predicted that over the same period there will be an increase of a full 80 percent. All indicators suggest that the demand for fish products will continue to increase in years to come.

With wild fish stock exploitation reaching maximum levels, per capita consumption of fish products on the rise, the world population expected to increase from the level of 4 billion today to 6 billion by the turn of the century, aquaculture must be viewed as a promising possibility to help meet these food demands. For a nation practically surrounded by water and replete with possible sites for raising inland fish species, fishery imports into the U.S. are surprisingly high. In 1976 the U.S. imported 6.2 billion pounds of fish products, valued at $2.2 billion. The U.S. fishery export in 1976 amounted to 341 million pounds, valued at $330 million. This leaves an annual trade deficit of practically $2 billion for foreign fish products. Close to 65 percent of the fish consumed in the United States is imported from foreign countries. Obviously, with the hemorrhaging we have with our oil purchases abroad, we have to look to every possible area to try and offset our export capability; or, if not that, certainly our consumptive capability, to produce domestically. Here I think we can make a contribution, if we put our shoulders to the wheel, to at least annihiliate this $2.2 billion deficit. The studious application of aquaculture techniques could help to reverse this unfavorable balance of payments situation.

A promotion of aquaculture will result in the creation of many new jobs, fishery employment on a year-round basis rather than a seasonal basis, and an overall stability to the historical boom-or-bust fishing economy.

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Mr. Chairman, the National Aquaculture Organic Act of 1978 will provide long-overdue impetus for the promotion of aquaculture in the United States. My desire is to encourage the development of aquaculture of all types in all parts of the United States. This would include encouraging aquaculture of marine as well as freshwater species, for aquatic plants as well as aquatic animals, and for presently cultured species as well as species as yet untested by the techniques of aquaculture, and for the rehabilitation and enhancement of the public fisheries as well as the promotion of commercial enterprises.

To accomplish these goals my legislation designates the Department of Commerce as the agency with ultimate responsibility. The Commerce Department will, however, operate in close conjunction with the Departments of Agriculture and Interior, as both those departments have proven themselves expert in many important aspects of aquaculture.

There are many facets to aquaculture, and I believe no single agency can or should be named the exclusive authority. A better approach is to tap the existing enterprise of the several departments and coordinate all aquatic efforts through the Department of Commerce.

An interagency committee—I want to stress this, Mr. Chairman—an interagency committee on aquaculture will be formed to facilitate and coordinate information and activities among the three departments as well as all other agencies and parties involved.

Senator MAGNUSON. Senator, your bill is S. 2762?

Senator GRAVEL. Yes.

Senator MAGNUSON. Do you have the suggestions you made on the makeup of the agencies?

Senator GRAVEL. I believe it's in section 6, Mr. Chairman.

Senator MAGNUSON. I think we should put that in the record at this point. This will be a very important part of this discussion. Page 19, section 6, under the title of "Coordination of Federal agency activities regarding aquaculture," and put in the record from page 19 up to page 21.[1] Well, that's the interagency committee.

Then on page 21 you say "the Secretary." Do you mean the Secretary of Commerce?

Senator GRAVEL. Commerce.

Senator MAGNUSON. All right.

I think that's something the committee is going to have to decide. All of these bills, as I mentioned previously, would likely have the same objective. The question is, how do we proceed with the organization to carry that out? Your bill is one of the main ones involved here.

Senator GRAVEL. Thank you, Mr. Chairman, and I appreciate your including that in the record. Let me underscore what we mutually share is an important view here as we begin in this area, because obviously there's going to be competition. But you can see where this competition in developing such an agency will permit what my legislation provides for, which is the formulation of a national aqua-

[1] See pp. 59–61.

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culture development plan. This plan, to be drawn up in the year following enactment, will involve concrete suggestions on specific directions and priorities to pursue the development of aquaculture in the United States. That provision does do that.

A grant program will encourage participation in what is generally considered a rather expensive enterprise. These grants will allow the private entrepreneur to get involved in a venture that would otherwise, by virtue of prohibitive starting costs, be reserved for large corporations or individuals of great wealth. A Federal aquaculture assistance fund is created for three purposes: One, to facilitate aquaculture financing by guaranteeing the loans made to aquaculture operations. Such loans have historically been unreasonably difficult to obtain. Two, make disaster loans for aquaculture stocks which are destroyed by unavoidable diseases.

Senator MAGNUSON. I might say, off the record.

[Discussion off the record.]

Senator MAGNUSON. Go ahead.

Senator GRAVEL. Thank you, Mr. Chairman.

The third point is to provide insurance coverage to aquaculture operations in those instances where insurance is not otherwise available.

My bill, S. 2762, is in many respects similar to the other two pieces of aquacultural legislation under consideration, H.R. 9370, the House aquaculture bill, and S. 2582, the Weicker bill. Both contain numerous points that coincide, as you pointed out. There are, however, three important new areas which my bill addresses, and I'd like to treat them briefly.

First, unlike the other aquaculture legislation, I would require that the national aquaculture development plan be formulated only after information is systematically gathered from all parts of the United States. This is to insure adequate input from interests as diverse as shrimp farmers in Florida, salmon ranchers in Alaska, oyster raisers in Maine, and catfish farmers in the Midwest. Information must be gathered on a regional basis. Only after these suggestions are received from all parts of the country should a national plan be drawn up. This would guarantee that the plan be tailored to the varied interests—and they are extremely varied, Mr. Chairman—and needs of aquaculturalists throughout the 50 States.

Second, I add the enhancement and rehabilitation of traditionally publicly owned fish stocks as a major goal to be addressed by this legislation. It seems obvious that in addition to encouraging development of commercial aquaculture for the private sector we should not overlook the desirability of rehabilitating the numerous depleted fish stocks which are of vital importance to the public sector.

Third and finally is the problem of the land and water access for aquaculture facilities. This may be an issue only germane to Alaska, but I think on investigation it may be found throughout the United States.

Senator MAGNUSON. While you are on that point, I think we're going to have to take a look at the bill I introduced, the c l zone management bill, and see how that would play into th

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for the coast, not inland. I think we have to coordinate such bills as yours and Senator Weicker's and others with coastal zone management.

Senator GRAVEL. You put your finger on what is the present tool in Alaska. I think that tool is adequate—in fact showed a great deal of forethought.

Senator MAGNUSON. And in that case there's a great deal of authority left with the States to submit plans. So the State of Alaska would have a big job coordinaing this sort of bill with that. I don't think it's a difficult plan, but they'd have to work together.

Senator GRAVEL. I'm told there is somewhat of a hiatus in Alaska and a particular need for legislation. I'm glad to see there has joined us in the room a mutual friend of ours, the chairman on the House side, who has the D–2 legislation within his committee.

One of the recommendations that I am making in legislation that I'll be introducing shortly is to have a Federal land use planning commission in Alaska which would be the coordinating body for the Coastal Zone Management Act in Alaska, so that this hiatus in access and development and planning can be breached. Otherwise we'll have a bit of a Catch 22; people will have plans, but won't be able to implement them because of access problems.

Senator MAGNUSON. In my State a great deal of this work is being done in conjunction with the Indian reservations that may be on the shores of Puget Sound: the Lummis up in Bellingham, the Nisquallies down at the mouth of the Nisqually River, and a lot of places. Would you have some of those places? Would the Indians in Alaska be involved?

Senator GRAVEL. Very much.

Senator MAGNUSON. Very many, don't you?

Senator GRAVEL. Almost the major part of the coastline would be touched, and so if we don't develop some central body, not only for the coastal areas but the inland area, we're going to be in great difficulties. And of course that's one of the total problems of the D–2 legislation if we don't solve the access problem in the region in question.

Mr. Chairman, I believe the contribution which aquaculture can make in helping to meet nutritional needs, stimulating commercial activities——

Senator MAGNUSON. Can I say this? In some cases this is providing a great deal of employment for the Indians, who would otherwise be unemployed.

Senator GRAVEL. No question; and not only the Indians. Obviously, this legislation can make a great contribution to the needs of our country—employment, food, and the like. Aquaculture is certainly an activity that has been neglected in this country for too long. The numerous benefits to be gained—commercial, nutritional, conservational, to name but three—have yet to be fully appreciated; and passage of the legislation by this committee and commensurately by the House would make a very great contribution to not only our interests in this country but throughout the world.

I thank you, Mr. Chairman.

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Senator MAGNUSON. Well, it seems to me one of the main reasons that we get Commerce involved; as you pointed out, is the balance-of-trade deficit for fishery products; that's their job down there, to see that we can do more to curb the imports of fish. Two billion dollars is a great deal in this balance-of-trade deficit. And so it's very important that Commerce have a really major role in this matter. And the marketing of local fish is being helped also.

Senator GRAVEL. I think, Mr. Chairman, if we could really produce and fill the void that exists—these markets have been established and pioneered. There's no reason why Americans can't go out and fill these in Alaska, with 200 miles, as a classic example. We now have the ability to move into this area. The fact that we provide a product that will then take part in the U.S. economy—we've just got to make those steps. But we're going to reach a limit. The only way we're going to project out beyond that, of course, is to move into aquaculture.

Senator MAGNUSON. We started encouraging the development of aquaculture—this started way back when I first came to Congress, which was a long time ago—by Federal contributions and grants for farmers putting ponds in their farms. There were hardly any in those days. Now it's pretty hard to find a reasonably sized farm in the Midwest that doesn't have a pond raising fish.

The amount of fish or protein per acre of water is 10 times over what an acre of land would produce. And of course I've seen the operation in China over many, many years. When I was there about 5 or 6 years ago, they were taking three crops out of one pond. I happened to be there when they were taking out a tremendous amount of fish. But the Chinese and the Japanese have been doing it for years, and it seems to me that we can make great use of our inland rather than our coastline for these things.

Senator GRAVEL. This legislation, Mr. Chairman, would really be the impetus to a real expanded effort on this whole plethora of activities.

Senator MAGNUSON. You would suggest it's long overdue?

Senator GRAVEL. Very much so, Mr. Chairman. It would merely complement your continued efforts here.

Senator MAGNUSON. Thank you.

Senator GRAVEL. Thank you, Mr. Chairman.

Senator MAGNUSON. The Senator from Connecticut.

STATEMENT OF HON. LOWELL P. WEICKER, JR., U.S. SENATOR FROM CONNECTICUT

Senator WEICKER. Good morning, Mr. Chairman. I am pleased to appear before you to discuss the three bills, all entitled National Aquaculture Organic Act of 1978.

First, I note the positive and timely action by the House in passing H.R. 9370, February 15. I also commend this committee——

Senator MAGNUSON. Is it H.R. 9370? I haven't looked at it closely. Is it similar?

Senator WEICKER. Not in all its respects, but the thrust

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And I also commend this committee for recognizing the importance of aquaculture to the Nation. During the past several years, I've become concerned with the oceans in terms of wise utilization of its resources and the conservation practices necessary to insure that the oceans will not be overexploited, as have much of our land resources.

Recently, the United States adopted a 200-mile fisheries conservation zone, which puts 10 to 20 percent of the world's living resources within the jurisdiction of this Nation. This means more fish for U.S. fishermen and the consumer. But what of the future? It is expected that the world demand for seafood will increase dramatically in the near future, the projections for fish product demands in the United States, for instance, will increase 80 percent by the year 2000.

No matter what the circumstances, seafood production from wild stocks will soon plateau, and other methods of obtaining sources of high protein will have to be found.

Aquaculture is, therefore, of primary importance in helping to meet future seafood and other marine resource demands in this country and around the world and to alleviate some of the burden on wild fish stocks.

Presently, aquaculture accounts for roughly 10 percent of the world's production of fish products. In the United States it only provides a scant 3 percent. I believe, Mr. Chairman, that with a proper Federal program to eventually assist aquaculture ventures, this figure would expand to a much higher percentage in the next decade. The potential is there.

How, then, can Congress promote a new era of aquaculture?

There are fine factors that I believe should be addressed by this committee in developing a viable aquaculture program.

First——

Senator MAGNUSON. Aren't we very low in fish consumption, compared to other nations of the world?

Senator WEICKER. Yes. I would say so, in consumption.

Senator MAGNUSON. Yes, consumption.

Senator WEICKER. I would say so, because of the fact that we only eat certain species, and the underutilized species, which are consumed in vast amounts by the rest of the world, we don't even touch.

Senator MAGNUSON. Yes, that's right. That's what we call "trash fish," and other people utilize them.

Senator WEICKER. I dare say there's nobody in this room, for instance that eats squid—fried clams however are very popular in this country. I think Howard Johnson's sells them frozen and every which way. You couldn't tell the difference between fried clams and fried squid. You couldn't tell the difference at all, yet we throw tons of squid away every year.

First, a focus for aquaculture development must be established within the Federal system. The present programs are distorted and spread in many directions. Conflicts in jurisdictional funding will continue to be a major drawback in any future aquaculture program. The leadership must come from one source, the agency that has the expertise.

H.R. 9370, S. 2582, my bill, and S. 2762, Senator Gravel's bill, place primary jurisdiction within the Department of Commerce.

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H.R. 9370 and S. 2762 give some share of responsibility to the Department of Agriculture and the Department of Interior.

Now, Mr. Chairman, what I'd like to do at this juncture—I know you have other witnesses, so I will dwell on one point. I'd like to submit my entire statement for the record.

Senator MAGNUSON. We'll put it in the record.

Senator WEICKER. And dwell on just this point that I've made relative to the jurisdictional aspects of the problem, because this is absolutely the key.

I think that the best way to exemplify what can happen when Congress gets its act together is the way in which we deem energy to be a Crisis problem, and so, as you know, here in the Senate, we took all the energy from the various committees and put it into one committee. We recognize it as something which could not stand an attack from many sources, but rather we have to direct it in a single thrust. We did that. On the other hand before I criticize the bureucracy or anyone else, you know, as I do, that here, within the Senate, jurisdiction over our oceans is in Commerce, Interior and in Environment and Public Works. That duplication and proliferation is magnified many times within the bureaucracy.

Mr. Chairman, you and I think we're in a unique position to comment on this for the simple reason that I used to sit on Commerce and I now sit on Interior. You now have become the chairman of Appropriations, no longer chairman of Commerce. Quite frankly, even as a member of Interior, I would like to see my committee give up its jurisdiction and have this jurisdiction focused in Commerce. I think that it's only when this happens that we're going to get the kind of utilization of our resources that will make sense and will have a productive result. As long as the fight continues, both within the Senate and within the bureaucracy, there is no chance of successfully meeting the challenge to this Nation.

So, I would again reemphasize what the bills say. Interagency committees to pass information, that's fine. But still, we have not come to the point where Commerce is the focus of our efforts in the legislative branch and NOAA is the focus of our effort in the executive branch, and that ought to be.

And I think the American people are getting tired of the turf battles that are taking place in this town. We just went through one on this business of aiding the cities, between HUD and HEM and the Department of the Treasury. Now, we have another one when it comes to our ocean resources. I think it's really part of our leadership to do what is correct, given the situation, not to do what's correct, given anybody's particular political position or governmental position.

I'll be glad to discuss this further—I hope, as I said before, I'd want the full text of my comments put into the record. I do think that in every aspect of insurance, of loan guarantees and all the rest, is good legislation. Let's get it passed, as I said before. If we're going to use Senator Gravel's, that's fine. But let's get some legislation passed.

But, most important, we know what's going to happen. We know the world has to turn, both for food and energy, to the oceans. Now,

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let's do it the right way. And I think that's going to take some leadership on the part of some of those who are sitting right here.

Senator MAGNUSON. It goes even further than that. I've attended quite a few international fisheries conferences, and we have always started out with two strikes against us, because our representatives may be down at the third level in the State Department or come from several different departments and we have no real leadership. No one is the so-called "head man." They deal with ministers of fisheries, who can make decisions right at the table.

Senator WEICKER. Right.

Senator MAGNUSON. And we're always coming up second and third best in the international conferences due to this. And even in the Law of the Sea conference, we're running into that. Although we did do it right in having Ambassador Richardson as our representative. But it's happened over and over again. This would fall into the same situation, domestically, unless we did what you suggest.

Senator WEICKER. Well, I hope that comes to pass. I notice we've got some of our very able colleagues from the House here, and I'm sure they can go ahead and carry the ball. But let's hope the legislation is passed, and let's hope that we have the courage to go ahead and implement it.

Senator MAGNUSON. We thank you, and we'll put your statement in the record in full.

[The statement follows:]

STATEMENT OF HON. LOWELL WEICKER, U.S. SENATOR FROM CONNECTICUT

Mr. Chairman and members of the Committee, I am pleased to appear before you to discuss H.R. 9370, S. 2582 and S. 2762, all entitled the "National Aquaculture Organic Act of 1978".

First, I note the positive and timely action by the House in passing H.R. 9370 on February 15, 1978; I also commend this committee for recognizing the importance of aquaculture to the nation.

During the past several years I have become concerned with the oceans in terms of wise utilization of its resources and the conservation practices necessary to insure that the oceans will not be over exploited as have much of our hand resources.

Recently, the United States adopted a 200 mile fisheries conservation zone which puts 18–20 percent of the world's living resources within the jurisdiction of this nation. This means more fish for U.S. fishermen and the consumer. But, what of the future? It is expected that the world demand for seafood will increase dramatically in the near future. Projections for fish product demands in the United States, for instance, may increase 80 percent by the year 2000.

The sea still has potential for producing more food, but only with changes in attitude toward underutilized species. This can only be done with the implementation of proper management of all species. But, no matter what the circumstances, esafood production from wild stocks will soon plateau and other methods of obtaining a source of high protein will have to be found.

Aquaculture is, therefore, of primary importance in helping to meet future seafood and other marine resource demands in this country and around the world, and to alleviate some of the burden on wild fish stocks. It can make a significant contribution to the nutritional base in many parts of the world, although I do not consider it a panacea for totally feeding the world's hungry people.

Aquatic organisms have extremely high productivity and are some of the best converters of primary foods. Many organic feeds that are not presently palatable to humans can easily be converted to highly nutritional and inexpensive protein by feeding these to fish under controlled conditions.

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Expanding our production of food products is best done through aquaculture techniques rather than attempting to develop new sources or to push our agricultural output any further. Presently, aquaculture accounts for roughly 10 percent of the world's production of fish products, but in the United States, it only provides a scant 3 percent.

I believe, Mr. Chairman, that with a proper Federal program, to initially assist aquaculture ventures, this figure would expand to a much higher percentage in the next decade. The potential is there.

The poor development of aquaculture in the United States has been due to the past abundance of wild stocks of fish and to the phenomonal success of our agriculture. U.S. agriculture got huge boosts from the Lands Grant Act and other government programs. The results have been that this country is the greatest producer of food in history and still produces more that it uses.

Aquaculture on the other hand has received little help in the early stages. The Department of Agriculture established programs to assist fresh water farming while virtually nothing had been done to enhance marine aquaculture until a few years ago. The Sea Grant program of the National Oceanic and Atmospheric Administration has been sponsoring a wide spectrum of aquacultural programs over the past few years. But, this is only a drop in the bucket in terms of the overall needs to make aquaculture an important part of this nations food producing industry.

How then, can Congress promote a new era of aquaculture?

There are five factors that I believe should be addressed by this Committee in developing a viable aquaculture program. They are:

1. Focus for all programs
2. Scientific achievements
3. Environmental considerations
4. Economic considerations
5. Program coordination and information dissemination

These five factors are not necessarily in order of importance, but each is dependent on the other, and must be considered to ensure a successful industry in the future.

FOCUS

A focus for aquaculture development must be established within the Federal system. Presently, programs are disjointed and spread in many directions. Conflicts and jurisdictional funding will continue to be a major drawback and inhibit any future aquaculture programs.

The leadership must come from one source—the agency that has the expertise. H.R. 9370, S. 2582 and S. 2762 place primary jurisdiction within the Department of Commerce. H.R. 9370 and S. 2762 give some shared responsibility to the Department of Agriculture and the Department of Interior. Other bills in the Senate give such jurisdiction solely to the Department of Agriculture.

These differences in opinion regarding jurisdiction point out the difficulty facing this Committee in determinining once and for all, where the focus for aquaculture should be placed.

It is my belief that the future of aquaculture lies mainly with marine organisms. Of course there is still room for growth in fresh water aquaculture particularly with such species as trout and tilapia. However, the largest growth will be realized with salmon, shrimp, perhaps eels, northern lobster, and marine shellfish, such as mussels, scallops oysters and clams.

It is this future emphasis on marine species that makes the Department of Commerce and the National Oceanic and Atmospheric Administration (NOAA) the logical choice for the aquaculture focus. NOAA has great expertise in marine science and all aspects of fisheries management. Various divisions of NOAA such as the Sea Grant program, and the Office of Fisheries have already been involved in marine aquaculture.

I realize the problems that may be raised by the sole involvement of Commerce without the input of Agriculture and Interior as presented in S. 2582. However, it has always been my belief that we must consolidate Federal programs whenever possible, especially in the presently disjointed areas of oceans and marine fisheries.

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SCIENTIFIC ACHIEVEMENT

The science and technology necessary to support the aquaculture industry has made significant advancements over the past few years. Salmon research, for instance, has placed that family in a good position to be one of our most successful aquaculture species in the near future. The ocean ranching technique in which young salmon from fresh water hatcheries are released and then recaptured in the same waters after spending two or three years at sea. Up to four percent of the releases have been recaptured in past experiments. Other scientific experiments to study the genetics, physiology and disease control of shellfish will prove to increase yields of oysters, clams and scallops in the future.

Although significant research is now being conducted there is much to be done. S. 2582 contains all of the House language pertaining to scientific studies with important additions that would provide for studies on all aspects of organisms as potential feed sources. Development of cheap abundant feedstuffs may be the most important part of any research program. Presently, many new aquaculture ventures could start except for the lack of economically viable feed sources.

ENVIRONMENTAL CONSIDERATIONS

Language is added in S. 2582 to clarify that research on the effects of aquaculture on the estuarine and other water areas will include effects on the natural flora and fauna.

If the Federal government is to become involved in this fledgling industry we must assure that from the beginning, the environment and its inhabitants are properly protected from adverse impacts of aquaculture practices.

Convesely, aquaculture cannot be carried out unless the environment contains an abundant source of clean water with quality suitable for the species to thrive. The clean water supply must be abundant and chance for pollution of the source minimal.

Site selection and research on pollution control is a vital part of any aquacultural program. The site should be adequate to carry out the culturing process without adversely altering the immediate and adjacent environments.

ECONOMIC CONSIDERATIONS

The whole issue of aquaculture has not been properly addressed in the United States. It is still considered a high-risk, capital-intensive industry. Large initial investments for building and holding pond construction, disease control, physiological and nutritional research and purchasing and developing seed stocks are necessary to begin an aquaculture operation. It is still, therefore, considered a speculative industry and private investment will not become available until assurances of attractive returns are realized.

For many of these reasons past aquaculture ventures have failed in the United States. Such failures have led to strong feelings that aquaculture attempts should not go any further.

Most attempts at aquaculture in the past have been premature and conducted by small, undercapitalized companies that could not go beyond their initial operational phases. Lack of adequate funding is therefore a major drawback.

Federally guaranteed loans to industry, as written into all aquaculture bills before this committee, would provide the financial stimulus to move the industry ahead.

I am concerned, however, with providing too much too soon. The purpose of Federal involvement in the aquaculture industry is to provide initiatives. After some time period the industry should be able to go on its own. It is, therefore, foolhardy to provide a large authorization for loan guarantees that might push the industry too fast. As mentioned before, there is much research that is needed before aquaculture is off and running.

S. 2582 provides for a total loan guarantee authorization of $100 million. Although it is difficult to project the actual amount needed, Aquatic International, Inc. has provided me with an analysis of capital required for the aquaculture industry to supply shortfalls between domestic supply and demand by 1985. This figure totals $84 million for catfish, clams, lobster, salmon, shrimp, trout, oysters, mussels, scallops, mullet, tilapia, seaweed, baitfish,

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Perch, bass, abolane, eels, pompano, and miscellaneous low-cost species. Therefore I believe the $100 million figure in S. 2582 is adequate to begin serious growth of the industry.

Other aspects of S. 2582 that are significantly different from the other aquaculture bills are the elimination of disaster loans and all but the essential stock insurance.

Disaster loans are presently provided by the Small Business Administration (SBA). I understand, however, that SBA has not provided many loans to the industry in the past and is viewed as a poor source of disaster loans.

I am concerned that the establishment of a new bureaucratic layer duplicating SBA's authority will create many problems in the future. I would rather try to strengthen the SBA program to be more receptive to the needs of the aquaculture industry.

Federal insurance, in my opinion, should not be an all-risk insurance program. Liability insurance should be easily obtained from private agencies.

Although many aquaculture facilities will be in high-risk coastal areas, there should be adequate private insurance available for building and equipment.

Stock insurance, on the other hand, is definitely a problem because of the extreme risk involved with maintaining a cultured, costly stock of fish. Any number of things such as changes in temperature, water contamination, disease, power failure, or predation could wipe out an entire stock. Insurance companies would be reluctant, and would charge high premiums, to provide coverage.

PROGRAM COORDINATION AND INFORMATION DISSEMINATION

One of the main problems with aquaculture programs in the past has been lack of coordination and information dissemination. Research, data, and publications have been scattered throughout the world with no attempt to interrelate them.

In all of the aquaculture bills, an Interagency Committee on Aquaculture would be created to ensure a continuing exchange of information and to review aquaculture projects of all Federal agencies. I believe that such a committee is essential to the overall program, but should not have any control over individual projects.

Mr. Chairman, this great nation is facing increasing trade deficits, which can, if not abated, place us in a position of weakness in the international arena. The annual deficit in trade of fish alone amounts to about $1.5 billion and a healthy aquaculture industry can do much to reduce this amount. On this premise alone it may be worth the money and effort.

I once again commend you and the members of the committee for your expeditious consideration of the various aquaculture bills and I appreciate your attention to my remarks.

Thank you.

Senator MAGNUSON. Now, is John Murphy here?

STATEMENT OF HON. JOHN M. MURPHY, U.S. REPRESENTATIVE FROM THE 17TH DISTRICT OF NEW YORK; ACCOMPANIED BY HON. ROBERT L. LEGGETT, U.S. REPRESENTATIVE FROM THE 4TH DISTRICT OF CALIFORNIA; AND HON. JOHN B. BREAUX, U.S. REPRESENTATIVE FROM THE 7TH DISTRICT OF LOUISIANA

Mr. MURPHY. Yes, Mr. Chairman.

Senator MAGNUSON. John, we'll be glad to hear from you.

Mr. MURPHY. Thank you, Mr. Chairman. I have with me today Congressman Leggett, who chairs our Fisheries and Wildlife Conservation and the Environment Subcommittee; and Congressman John Breaux, who chairs our Oceanography Subcommittee.

Senator MAGNUSON. All right, we'll be glad to hear from all of you.

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Now, it was mentioned that the House passed a similar bill—when was that?

Mr. LEGGETT. It passed the bill on February 15, 1978, Mr. Chairman.

Senator MAGNUSON. OK. Go ahead.

Mr. MURPHY. Thank you, Mr. Chairman. I'd like to briefly summarize my statement, if I may.

Senator MAGNUSON. We'll put it in the record in full.

Mr. MURPHY. The United States presently imports more than 60 percent of its fish for human consumption. I think that a viable aquaculture program will be needed to insure that, in the future, we have an adequate source of protein which is within the economic means of the individual American.

Our subcommittees received testimony from groups that ranged from Maine to Alaska. We note that the studies provided to us by NOAA have shown that worldwide shortages may be expected in fishery products within 3 to 10 years. So I think we're probably a little behind the clock at this time in enacting legislation to promote aquaculture on a need basis, as you discussed with Senator Gravel and Senator Weicker.

Both China and Japan have been utilizing aquaculture for years and have seemed to place more and more emphasis on that source of protein for their populations.

Currently there are 21 Federal agencies responsible, either directly or indirectly, for programs involving aquaculture. As a result we find mixed leadership, absence of definitive guidelines, and no clear-cut division of responsibilities regarding an aquaculture program. That is why in February H.R. 9370 passed overwhelmingly in the House. This legislation would establish a national comprehensive plan for aquaculture, to be developed by the Secretary of Commerce in consultation and close coordination with the Secretaries of Agriculture and Interior and other appropriate Federal and State agencies.

One of the major purposes of H.R. 9370 is to provide incentive and financial support for the private aquaculture farmer. The bill provides for the establishment of a loan guarantee program, to be administered by the Secretary of Commerce, for financing the construction, reconstruction, and/or reconditioning of aquaculture facilities.

I think it probably fits right in with the Coastal Zone Management Act, which, through your leadership, was enacted in 1972. Perhaps this legislation could move forward under the same comprehensive direction.

Senator MAGNUSON. I don't think they're incompatible at all. I think they fit right together.

Mr. MURPHY. I think perhaps the only problem would be—and I think the language could easily be worked out—that freshwater aquaculture proceed in a manner that is acceptable to the existing industry which is presently operating in this country.

Senator MAGNUSON. Yes.

Mr. MURPHY. In addition, loan guarantees will be issued for the acquisition of stocks of aquatic species, initial operating expenses,

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and marketing operations exclusively for aquaculture products. No guarantees will be issued unless the Secretary of Commerce has determined that the owner-borrower has the necessary qualifications for the satisfactory operation and maintenance of an aquaculture facility.

The National Aquaculture Organic Act places a major emphasis on supplying adequate seafood sources through a coordinated national policy. It does so by providing the essential framework by which the Federal Government and private industry may work with each other to insure adequate food resources for present and future generations.

I thank you, Mr. Chairman, for the opportunity to be here this morning.

Senator MAGNUSON. You agree. You probably mentioned the fact that we haven't developed our own market at home with aquaculture products in the House report. We have almost a $2 billion trade deficit, which is getting worse.

Mr. MURPHY. That is correct. As I stated earlier, the U.S. presently imports 60 percent of its fish consumption.

Mr. MAGNUSON. Yes. That is one important reason why we should start with this. As I said, it's long overdue, isn't it?

Mr. MURPHY. It sure is. I think if we can take a page from Senator Gravel's book, we see that Alaiska has probably invested about half a billion dollars in aquaculture development, and the Canadians have done even better. The State of Washington has also taken great leadership in this area, which will probably result in a billion dollars of additional income to the United States in the next few years.

Senator MAGNUSON. And cut down the balance-of-trade deficit.

Mr. MURPHY. Yes. Definitely.

Senator MAGNUSON. All right. We'll put your statement in the record in full.

[The statement follows:]

STATEMENT OF HON. JOHN M. MURPHY, U.S. REPRESENTATIVE FROM NEW YORK

Mr. Chairman, the National Aquaculture Organic Act represents an important step to provide a comprehensive program to develop and increase one of our Nation's most valuable resources, our food supply. Unlike most of our other natural resources we are presently capable of providing ample food supplies for generations to come. But today our world production of seafood is declining. United States imports presently account for more than 60 percent of its fish for human consumption. Testimony received during our House subcommittee hearings, ranging from Maine to Hawaii over a 2-year period, disclosed that world fishery resources, once thought to be unlimited, are now estimated to be declining. Studies by the National Oceanic and Atmospheric Administration have shown that worldwide shortages may be expected in fisheries products within 3 to 10 years. Based upon present calculations the demand for seafood products will increase 80 percent by the year 2000. New ways must be developed to provide the food necessary to support us and future generations. One proven way is through the application of aquaculture.

Aquaculture is the process by which aquatic plants and animals are cultivated in marine, brackish, and fresh water environments. Worldwide output from aquaculture has nearly doubled during the past 5 years. It presently accounts for nearly 10 percent of the world's fisheries products, but for only 3 percent of such products in the United States. Foreign countries have long recognized the practical results achieved through aquaculture. China, as an example, presently produces more than 50 times the production of the United States. Japan also occupies a leading position and continues to place more

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emphasis on production with each succeeding year. Total Japanese production is more than 11 times that of the United States. For these countries the question of food is a very real problem, a problem that we in this country will soon recognize.

Currently there are 21 Federal agencies responsible either directly or indirectly for progams involving aquaculture. As a result there is a total lack of leadership, absence of definitive guidelines and no clear-cut division of responsibilities. H.R. 9370 would be aimed toward establishing a national comprehensive plan for aquaculture to be developed by the Secretary of Commerce in consultation and in close coordination with the Secretaries of Agriculture and the Interior and with other appropriate Federal and State agencies. The plan would be required to be developed within 1 year from the date of enactment of the legislation. The bill sets forth an interagency committee whose function will be to carry out a continuing exchange of information among the charged agencies to see that those agencies carrying out programs related to aquaculture carry them out in conformance with the national plan. This committee will include the Secretary of Commerce who will serve as Chairman, and the Secretaries of Agriculture and the Interior, the Administrators of the Environmental Protection Agency and the Small Business Administration, and the heads of other appropriate Federal agencies. By centralizing responsibilities in this fashion, a coordinated policy under single management will hopefully achieve the desired results.

One of the major purposes of H.R. 9370 is to provide incentive and financial support for the private aquaculture farmer. The bill provides for the establishment of a loan guarantee program to be administered by the Secretary of Commerce for financing the construction, reconstruction, and/or reconditioning of aquaculture facilities.

In addition loan guarantees will be issued for the acquisition of stocks of aquatic species, initial operating expenses, and marketing operations exclusively for aquaculture products. No guarantees will be issued unless the Secretary of Commerce has determined that the owner-borrower has the necessary qualifications for the satisfactory operation and maintenance of an aquaculture facility. In order to help insure that the guarantees are self-financing, an investigation fee of not more than one-half of one percent of the original amount and a loan fee of not more than one-half of one percent per annum of the outstanding balance are charged the borrower by the Secretary. Further assistance to promote aquaculture would be provided in the nature of disaster loans and insurance.

The need for a national aquaculture bill is selfevident. At no other time in history have we been faced with the prospect of exploring alternate food sources. In recent years the world catch has fluctuated widely. And in view of such factors as the increase in the world's population, a corresponding increase has been made in food demand. The Food and Agricultural Organization of the United Nations suggests that an overall increase in aquaculture should make a difference in satisfying this increased need.

In addition, aquaculture is expected to boost new capital into the present economy. As an example, if production is stimulated through application of aquacultural techniques in the Alaskan salmon industry, this will translate into one billion dollars of additional revenue. As a result, in just the salmon industry alone, where present technology has already played a major role, new ventures have begun in Washington, Oregon, and California.

The "National Aquaculture Organic Act" places a major emphasis on supplying adequate seafood sources through a coordinated national policy. It does so by providing the essential framework by which the Federal Government and private industry may work with each other to insure adequate food resources for the present and the future generations to come.

Mr. Chairman, I hope this distinguished Committee will report this legislation at an early date so that we can proceed to assist in meeting the food needs of our nation and in contributing to the solution of the world food problem.

Senator MAGNUSON. Bob, do you want to go next?

Mr. LEGGETT. Thank you very much, Mr. Chairman.

I have been the subcommittee chairman for Fisheries and Wildlife Conservation and the Environment under the House Committee on

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Merchant Marine and Fisheries, and I've been working with John Breaux, who chairs the Oceanography Subcommittee for about 3 years now in developing a good aquaculture bill H.R. 9370.

As you know, 100 percent of our trout, and I guess some 75 or 80 percent of our catfish are produced through aquaculture programs. So, we're not total neophytes in aquaculture development. Also we've seeded oyster beds and clam beds through the years; however what we have determined is that there are a lot of areas that still need to be pioneered.

Mr. Breaux and I were in Kyoto, Japan, a couple of years ago, at the International Aquaculture Conference on Aquaculture.

We found that the Japanese were doing at least 10 to 20 times more than we were doing in aquaculture, even though we were doing great things in freshwater aquaculture. Also, we determined that we really wanted to move ahead in aquaculture, since, as you know, we are fishing our shores relatively bare, what we need is to beef up our total capability measurably, and one of the great ways to do it is through a developed, coordinated aquaculture program.

We found the Japanese, as an example, were breeding shrimp in hatcheries and releasing them in bays for commercial catching.

We found that down in the southern part of Japan they were using huge pens that were 10 x 20 x 10 or 15 feet deep to grow out literally millions of dollars worth of yellow-tail fish.

The subcommittee also went up to Lake Seroma, in Hokkaido, on the northern tip of Japan. We found that they were growing scallops there on strings in the bays which was highly productive and highly profitable. This is something that we could do here in the United States.

Well, we do grow oysters on lines in Drakes Bay in California. We're doing all kinds of things in this country, but we are just not coordinated and we have not developed a national program.

I can agree with everything that prior witnesses have said. Senator Gravel has said that we need to take a complete inventory and recognize that there's a large degree of regionalism. That is exactly correct. He's indicated that we need to enhance public-owned fish stocks, and, of course, this is what they did in his own State of Alaska. At Cordova, they determined that the earthquakes up there infused the subterranean water terrains considerably and deteriorated the salmon stocks. So, the salmon fishermen assessed themselves and used the proceeds to build an aquaculture facility where the fish hopefully return in a healthy condition. The fishermen reaped the benefits from that. They taxed themselves to create a greater troll fishery, so there's no real jealousy there, between the aquaculturists and the trollers.

In addition the State of Alaska is bonded for $25 million to develop aquaculture facilities in the State. With the Indian aspirations and the utilization of some of the funds that they received under the Native Claims Act, they have plans to developed aquaculture at a $500 million level.

Canada, has plans to spend $300 million to enhance the salmon fishery.

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I frankly think that aquaculture is the secret of solving the problem of more fish. In this way, the natives can have more fish and we don't put the existing salmon fishermen out of business in the resolution of these problems.

Senator MAGNUSON. You pointed out another thing. I can understand about Japan and Iceland and why their fisheries are much more important to their economies, percentagewise, than our fisheries are to our economy. But here's Canada, who is spending about $200 million next year for aquaculture.

Mr. LEGGETT. That's right.

Senator MAGNUSON. And our amount, which is scattered all over the place, is $15 million.

Mr. LEGGETT. And in the report that came out of the Department of Commerce, they said, "Well, we think our program is kind of adequate." Well, that's the report of the Department of Commerce under constraints of the Bureau of the Budget.

As a practical matter, we used the Department of Commerce to develop my bill, and that bill was written up in Sea Power magazine for this month. I gave a reprint of that article to your counsel. They talk about our H.R. 9370 as being a possible solution to our fisheries problems.

This bill was not drafted in a vacuum. It was drafted with the assistance of the House Legislative Counsel, some of your lawyers here on the Senate side, and some of the lawyers in the Department of Commerce. But it was not constrained by budget considerations. We put in the bill what we thought was needed to effect a renaissance in fish culture development in the United States.

Now, some people say this program needs to be carried out by the Agriculture Department. This morning I got in the mail a letter from our colleague, Dick Stone, who reprinted the study done by the National Academy of Science on aquaculture. Senator Stone is on the Agriculture Committee, and I think it's important that we have that reprinted. They've only spent $100,000 on that study, so it really didn't remake the world. And some people have referred to that study as a scientific conclusion that aquaculture ought to be reared, nurtured, and managed in the Department of Agriculture.

You know and I know that we are spending in the Department of Agriculture right now right at $12 billion. That's the amount that was put in the House budget resolution. Of that amount they're going to spend $3 billion on wheat, $2 billion on corn, and the remainder on a number of other things. Agriculture has been doing a good job in trout and catfish. We would like to see Agriculture continue with those programs and at the same time work with us in carrying out H.R. 9370.

Senator MAGNUSON. And the farm ponds.

Mr. LEGGETT. And the farm ponds, that's true.

Senator MAGNUSON. But the big job in the future is in the salt water area.

Mr. LEGGETT. Right. We have the Monterey abalone farm at Monterey. Unfortunately, they figured out ways to develop abalone,

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but when they get to be about four times the size of a dollar, the Japanese buy them for about $26 apiece.

So it's very difficult to develop those stocks and at the same time keep the otters from getting very, very healthy off of these very expensive abalone products.

Senator MAGNUSON. You have some shrimp farms down there, don't you?

Mr. LEGGETT. We have some shrimp and lobster farm activities in California also. We've discovered by holding hearings in Honolulu that the greatest economic development program in the State of Hawaii is aquaculture, and they think that they can do all kinds of things out there with their warm water, wind power, and clean water.

You know, you go out there and you don't really find many indigenous, local fish.

This is a good program for them, and they want to get into it very substantially. I think they have a $5 million program underway in Hawaii.

In my statement I talk about the magnitude of the loans that we think are required to get this program going.

With respect to oyster production, there are about 500 oyster operations in the United States, ranging in size from a one-man type operation to a large corporation with eight hatcheries and plants. Of this number, 250 are family operations with an average investment of $100,000, 200 have a $500,000 investment, 40 have an average of $1 million, 10 to 12 have a $5 million investment. One has a $25 million investment.

With respect to marine shrimp, there are 15 to 18 firms in the United States or Latin America involving U.S. and other capital. Of this number, two are in Texas involving $1 to $2 million, one is in Mexico involving $1 million, and one is in Florida involving $15 million. The others are in Central and South America involving investments of more than $10 million.

The indications are that there have been 14 failures in marine shrimp ventures, and most of those were probably due to undercapitalization.

With respect to freshwater shrimp, there are 22 firms involved. Of this number, 18 are in Hawaii with average investments ranging from $50,000 to $100,000, 1 is in California with $600,000, 1 is in Florida with $1 million, and 1 is in Puerto Rico involving $2 million.

British Honduras has American capital down there in the $3 to $4 million range.

In the United States there are 19 active salmon projects. Of this number, one is in California involving $400,000, and six are in Oregon, one of which involves Weyerhauser's investment of $15 million in Newport. We've held hearings down there and have seen firsthand what they've done.

The other five total $1 million. Six are in Washington. We've had the representative of the Indians there at Bellingham come before our committee.

Senator MAGNUSON. The Lummis.

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Mr. LEGGETT. Yes; and they brought us some excellent cultured, smoked salmon that they produced there.

Senator MAGNUSON. They have oysters, too.

Mr. LEGGET. They have oysters and a lot of good things.

Senator MAGNUSON. While you and I are talking, you're making my mouth water.

I'm glad to hear there's some abalone aquaculture, because I love abalone and they're so expensive now; it's really hard to buy.

But our so-called dungeness crab is disappearing, and the prices are so high. There's nothing we can do, and people love them.

Mr. LEGGETT. That's right, and there are some things that can be done other than clearing up the pollution of the water.

Senator MAGNUSON. We never paid any attention to these things. They're disappearing and getting so expensive. Look what we've done with the treaty on king crab. King crab is now coming back.

Mr. LEGGETT. The thing we just discovered is that we were giving the Japanese all of our snow tanner crab. Now there are people that want to go up there to recapture it for American markets. The real problem now is how to get it into our markets in a fresh condition for people who want it. It has been frozen in the past.

So we're quite excited about this program, and we don't think that there's really any conflict with the Department of Agriculture at all. We want to get going with this big loan guarantee program.

Senator MAGNUSON. As a matter of fact, we're not so sure. We can get the information for the record. But if a farmer wants to get a pond, he can get a loan, can't he?

Mr. LEGGETT. That's right.

Senator MAGNUSON. That's been going on for a long time. As a result, we've got all kinds of ponds, 3- or 4-acre ponds that produce tremendous amounts of protein.

Mr. LEGGETT. That catfish program has been very good. In the Farmers Home Administration, loans over the past 2 years have totaled only $7.2 million, of which only $2 million were for production programs. One was in shrimp for about $1.1 million, and the other was in oysters for about $100,000.

So the Farmers Home Administration has barely wet its nose in these programs. Let them go ahead with these loans, which we welcome.

Senator MAGNUSON. But the programs are there and they've been established for years.

Mr. LEGGETT. Sure. Let them go ahead and continue what they're doing, and let us go ahead and move in Commerce in this saltwater aquaculture program. Let us compete with the Japanese. We have a blueprint ahead of us, and all have to do is follow it. And we don't have to scrap among ourselves at all in following it.

I think we have a good insurance provision in the bill, where the participants pay 50 percent of the premium, which is very competitive with the farm crop insurance programs, where many times they end up only paying 10 to 15 percent.

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I know that Mr. Breaux has some important words to say. I think I'll turn it over to him at this time.

[The statement follows:]

STATEMENT OF HON. ROBERT L. LEGGETT, U.S. REPRESENTATIVE FROM CALIFORNIA

Mr. Chairman I appreciate the opportunity to testify before this distinguished committee and in the interest of time I will try to keep my remarks brief.

Mr. Chairman, traditional stocks of marine resources, once thought to be unlimited, are now estimated by some experts to be capable of yielding a maximum global harvest of 100–150 million metric tons per year. More conservative estimates rarely exceed 100 million metric tons, including that of our National Oceanic and Atmospheric Administration (NOAA) which estimates the 100 million figure will be reached by 1980. World fish catches currently exceed 68 million metric tons and have hovered around 70 million metric tons for several years.

What these figures mean is that, on a worldwide basis, we can expect a shortage of fisheries products within the next decade if the current population trend continues. The present world population is approximately four billion and is expected to expand to six billion by the year 2000.

World per capita consumption of fish is about 24 pounds yearly, ranging from less than one pound in Afghanistan to over 79 pounds in Japan and Iceland.

Currently, we import for consumption more than 60 percent of our fishery products, amounting in 1977 to about 4.5 billion pounds. With U.S. consumption of fish and shellfish on the increase, reflecting a healthy demand by consumers, we are a long way from realizing our domestic aquaculture production potential, which currently accounts for only 3 percent of all fish and shellfish consumed domestically.

The potential for aquaculture in the United States is enormous. Per capita U.S. consumption of fish and shellfish in 1977 was around 12.9 pounds and is projected to increase to 15.2 pounds by the year 2000. For example, between 1975 and 1980, the demand for domestic shrimp alone is projected to increase by 13 percent and by the year 2000 by 70 percent. For salmon and trout, demand is expected to increase 75 percent by the year 2000 and for catfish 84 percent. For all fish and shellfish combined, the projected demand by the year 2000 is expected to exceed 1975's by 80 percent—an average annual increase of 3.4 percent of the 1975 rate. This compares favorably with the projected annual increase in demand rates for most other types as follows: pork, 2.7 percent; beef, 3.0 percent; mutton and lamb, 3.6 percent; and poultry, 4.1 percent.

Now, having said this, let me tell you what other countries are doing in this area. Japan has recently launched a 7-year program that calls for spending more than $600 million to foster the expansion of fish farming. Canada has recently committed itself to a $300 million program aimed at restoring the British Columbia salmon stocks; and Mexico has recently launched more than a $1 billion fisheries program, of which more than $200 million will be committed to aquaculture.

In comparison, approximately $15 million is being spent by the United States Government in this area. For example, in 1975, aquaculture investments in research and development were carried out in the following Federal agencies: Department of Commerce, $6.9 million; Department of the Interior, $4.3 million; Department of Agriculture, $750,000; Environmental Protection Agency, $50,000; and various other agencies, the remaining $3 million.

In the absence of a comparable broadbased Federal program some states are taking the initiative themselves. For example, Hawaii has recently launched and expanded aquaculture program, committing over $5 million to it this year and the State of Alaska has just recently embarked on a $500 million fisheries program of which over $250 million has been allocated to the building of salmon fish hatcheries alone.

Some of the obstacles uncovered by our Committee which have limited development of aquaculture in the United States involve such things as inadequate information; inadequate funding; inadequate marketing incentives; inadequate venture capital—for example, the SBA made eight aquaculture loans in 1975 totaling $185,000 and only two in 1976 totaling $26,000; un-

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availability of insurance; lack of trained personnel; and duplication of and lack of coordination among Federal agencies—11 Federal agencies have been identified as having a direct involvement in aquaculture and some ten agencies have programs that are indirectly related.

With these obstacles in mind and with a view toward assisting in meeting the fish protein needs of this nation, the Subcommittee on Fisheries and Wildlife Conservation and the Environment, which I presently chair, and the Subcommittee on Oceanography chaired by Congressman Breaux (both of the Committee on Merchant Marine and Fisheries chaired by Congressman Murphy), conducted a total of 13 days of hearings in Washington and in the field over the past two Congresses, drafted, refined, marked up and reported a bill aimed at promoting the commercial development of American aquaculture. That bill, H.R. 9370, which I introduced along with Chairmen Murphy and Breaux, Mr. Forsythe, and 21 other Members of the House, I am delighted to report passed the House of Representatives on February 15, 1978 by a margin of nearly 2 to 1.

Briefly explained the bill would do the following:

1. Require the Secretary of Commerce, in consultation with the Secretaries of the Interior and Agriculture and appropriate state and regional fishing interests to prepare and establish an aquaculture development plan within one year from the date of enactment of this legislation;

2. Require the Secretary in developing the plan to identify each aquatic species which can be cultured on a commercial basis;

3. Require the Secretary to include in the plan an aquaculture development program for each species and each program would be implemented either individually, jointly, or collectively by the Secretary of Commerce, the Secretary of the Interior, or the Secretary of Agriculture, as the case may be;

4. Require the Scretary of Commerce to establish and maintain an Aquaculture Information Center;

5. Provide for the establishment of an Interagency Committee on Aquaculture, to be headed by the Secretary of Commerce;

6. Authorize each of the three Secretaries to make grants on a 50–50 matching fund basis to assist in carrying out their responsibilities under the legislation;

7. Authorize the Secretary of Commerce over a 5-year period to guarantee loans totaling $500 million for the purchase or construction of aquaculture facilities, the acquisition of stocks, and initial operating expenses;

8. Authorize the Secretary of Commerce to make loans totalling $250 million to owners of facilities whose facilities or stocks have been damaged or destroyed as a result of natural disasters;

9. Authorize the Secretary of Commerce to make insurance available to owners of aquaculture facilities totaling $1 billion in face value, the cost of which would be shared by the Secretary and the owner-borrowers on a 50–50 basis; and

10. Authorize to be appropriated to the Secretary of Commerce $4 million for fiscal year 1979, $15 million for fiscal year 1980, and $17 million for fiscal year 1981, and one-half of such amounts each to the Secretaries of the Interior and Agriculture for the three-year period.

Now having said this, let me identify several areas which I think are critical and which will be the focus of attention as aquaculture legislation and Administration support or opposition are further considered. The first of these concerns the question of lead agency. There is a tendency on the part of some to consider the "turf dispute" between those favoring Agriculture and those favoring Commerce as the "lead" agency as a crucial or critical matter. Let me say that I think it is a most important one but that it is of less concern who does the job than that the job be done. I favor giving Commerce, or at least NOAA, the lead responsibility for what I think are a number of good reasons—including its historical support for both aquaculture research and development; its jurisdiction over commercial fisheries and its far greater expertise with marine and brackish water systems and biota; its development in 1976, under the leadership of David Wallace, of the interagency Subcommittee on Aquaculture involving more than 20 Federal agencies; its formation of a national aquaculture plan which calls for increasing NOAA's aquaculture program from the 1976 level of $6.4 million to about $19 million by 1979 and continuing at that level for another decade; and its

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more extensive and deeper working relationships with aquaculture counterparts in other nations of the world. I am pleased that Agriculture has been given more explicit aquaculture authority and direction in the 1977 Food and Agriculture Act and there is a great deal of work which that Department can and should do in aquaculture extension and in assistance to working farmers with an interest in aquaculture operations. However, I don't think Agriculture is presently anywhere near as well equipped to handle all that needs to be done as envisioned in H.R. 9370, for example, as NOAA is and that is why we selected NOAA to develop the national plan. Anyway, we welcome Agriculture's increased role in the development of aquaculture.

Another area of real concern relates to funding. Aquaculture offers a very real promise for significant economic contributions to our nation, including improvement in our balance of trade. In the long run the investments we are contemplating will be returned manyfold. But it is an area where significant investments by the Federal Government seem to be required if we are to hasten the developments in research and in operations which will be necessary before private enterprise can assume the proper bulk of investment needs and responsibilities.

In this regard, it is most important that the section 8 provision, which authorizes guarantees by the Secretary totaling up to $500 million, be retained in the bill. There is no question about it, a progressive aquaculture program will not get off the ground without an adequate loan guarantee program to support it.

To give some idea of the magnitude of loans that may be needed to accommodate aquaculturists throughout the country, I consulted with NOAA officials and a number of other interested parties and uncovered the following information with respect to aquaculture investments.

With respect to oyster production, there are about 500 oyster operations in the United States, ranging in size from a one-man type operation to a large corporation with eight hatcheries and plants.

Of this number, 250 are family operations with an average investment of $100,000; 200, with an average investment of $500,000; 40, with an average investment of $1 million; 10–12, with at least $5,000,000 involved, and one involving $25 million.

With respect to marine shrimp, there are 15–18 firms in the United States or in Latin America involving U.S. and other capital. Of this number, two are in Texas involving $1–2,000,000; one in Mexico involving $1,000,000; and one in Florida involving around $15,000,000. The others are in Central and South America involving investments of more than $10 million. Indications are there have been 14 failures in marine shrimp ventures, most of which were probably due to under capitalization.

With respect to fresh water shrimp, there are about 22 firms involved. Of this number, 18 are in Hawaii, with average investments ranging from $50,000 to $100,000; one is in California involving $600,000; one is in Florida involving $1,000,000; one is in Puerto Rico involving around $2,000,000; and one is in British Honduras involving $3–4,000,000.

There has been one freshwater shrimp failure in Texas involving $400,000, and two in Jamaica involving $800,000 each.

With respect to salmon, there are 19 active projects. Of this number, one is in California involving $400,000; six are in Oregon, one of which involves Weyerhauser's investment of $15 million, and the other five, a total of $1,000,000; six are in Washington involving Indians and $5–10,000,000 of Federal money; and six are in Alaska, two of which involve $2,500,000 each and the other four, $200,000 combined.

Mr. Chairman, I should also point out that I am most fearful that unless this provision is retained in the bill a large number of U.S. firms interested in going into aquaculture ventures will be taking their ventures to foreign nations. For example, one company official who has been following this legislation closely, recently advised that if his company would locate in a certain foreign country, his company had been promised all the land it would need for such venture rent-free and with guaranteed labor in the country at wages of no more than $0.50 per hour. That offer, naturally, would be most difficult to turn down.

This, Mr. Chairman, is what we are facing, and it is questionable as to whether we can meet that kind of competition. Nevertheless, in an effort to

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keep those businesses and jobs in our country, it is imperative that venture capital, disaster loans and insurance at reasonable rates be made available to persons and companies desiring to go into aquaculture production.

I could spend considerable time commenting on other portions of the bill, but I fear that I have taken more than the five minutes allowed already.

Thank you very much for giving me the opportunity to testify.

Senator MAGNUSON. Thank you. Mr. Forsythe?

Mr. LEGGETT. He's not here. I have his statement and if we could put it in the record, I'd appreciate it very much.

[The statement follows:]

STATEMENT OF HON. EDWIN B. FORSYTHE, U.S. REPRESENTATIVE FROM NEW JERSEY

Mr. Chairman, the National Aquaculture Organic Act offers an exciting opportunity for this nation to seize the initiative in the development of a new seafood production industry. Although worldwide output from aquaculture has approximately doubled in the last five years, and now amounts to some six million metric tons, United States aquaculture has remained relatively static.

One of the reasons why worldwide aquaculture production has increased is that several nations have recognized the potential for aquaculture development and have embarked on extensive aquaculture programs. Japan, for example, has established a seven year coastal fisheries development program and has allocated $333 million to develop aquaculture. Canada has committed $300 million to an ambitious aquaculture program for restoring British Columbia salmon stocks. Mexico has recently launched a $1 billion fisheries program, of which more than $200 million will be allocated to aquaculture.

In contrast to the aquaculture efforts of these nations, aquaculture in the United States has been small and insignificant for many years. While international aquaculture accounts for approximately ten percent of the world's fisheries production, U.S. aquacultue accounts for only three percent of all fish and shellfish consumed within the United States.

On an annual basis, the U.S. aquaculture industry is producing 48 million pounds of catfish, 2.6 million pounds of clam meats, 10 million pounds of crawfish, 17,000 pounds of fresh water prawns, 20 million pounds of oyster meats, one million pounds of pen cultured salmon, 60 million pounds of hatchery released salmon, 800,000 pounds of shrimp, and 30 million pounds of trout. Although these figures may seem significant, it is important to recognize that other nations such as Japan are producing 11½ times as much seafood by aquaculture as the United States. It is also significant to note that the United States is importing approximately $800 million of seafood products each year which could be produced domestically by the aquaculture industry.

Despite the relatively limited production of aquaculture in the United States, the future seafood market in this country provides an excellent opportunity for the expansion of the United States aquaculture industry. Within the United States, most traditional fisheries resources are already being harvested at or near their optimum sustainable levels. It is expected, however, that the demand for seafood products in the United States will increase 80 percent by the year 2000. Even allowing for the introduction of non-traditional species into domestic markets, the amount of seafood which will be available to meet domestic demands will probably be severely limited. The implications of a limited domestic supply are increased prices to the consumer, an inadequate supply of seafood products, and an increase in the U.S. seafood balance of payments deficit.

Mr. Chairman, in my view, aquaculture offers the potential for overcoming many of these problems. Proven techniques for the production of trout, salmon, oysters and other species are well known, and a review of the production records for these species provides a basis for estimating the potential for expanded production. The aquaculture production of rainbow trout, for example, has increased from just over one million pounds in 1954 to over 30 million pounds in 1972. With adequate markets and acceptable feed prices,

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it is estimated that production could be doubled in the next decade. Private oyster farmers currently produce 20 million pounds of meat annually, production through aquaculture could increase by a factor of ten in many places by suspending oysters above the bottom, a method currently used in Japan and experimentally tested in the United States. With adequate markets and satisfactory prices, private oyster production through aquaculture could be quadrupled during the next decade.

For nearly one hundred years, the salmon fishery has been enhanced by public aquaculture (hatcheries) and more than one quarter of our salmon, 60 million pounds, now originates in these hatcheries. Federal and State salmon culture experts estimate that landings attributable to public hatcheries could be increased by fifty percent during the next decade if funds were available for expanding hatchery production. Private salmon aquaculture also has a great potential for expansion. The production from this source, which was less than one million pounds in 1974, could exceed 80 million pounds by 1985 if certain production problems could be solved and if markets remain attractive.

If these breakthroughs can be achieved, the benefits to the United States will be extraordinary. As I noted earlier, the United States is currently importing over $800 million of seafood products which could be provided by U.S. aquaculture. In addition to meeting our own growing demand for seafood, and significantly reducing our seafood balance of payments deficit, the United States could become a net exporter of marine protein to meet the food needs of other nations.

If the future is so bright, the question is why do we need to enact a National Aquaculture Organic Act? Although the answer is not simple, it can be summarized by saying that there are significant obstacles to the development of the aquaculture industry which can be overcome by this legislation.

The development of aquaculture for any species is a two-stage process. First, it is essential that an understanding of the basic biology of the species be developed. This entails a knowledge of what makes the species reproduce, what is the optimal growing temperature, what is the best food mixture at various stages of development, etc. Once this information is available, it is possible to move into the second stage of development—an engineering, biological and economic stage. There is a major difference between growing 100 fish in a laboratory tank and 100,000 fish in an aquaculture facility. The problems of disease, waste disposal, water quality within the system, nutrient mixes and other factors become magnified. The problems are no longer biological.

For many species, the basic biology is known. What is needed is second-stage development and here is where the problem lies. Because of the present high-risk nature of the fledging U.S. aquaculture industry, investors are generally reluctant to invest their funds in aquaculture when higher and safer returns are available elsewhere. We are thus confronted with the proverbial chicken and egg situation. Investment money is available to develop the aquaculture industry, but only after second-stage development is completed. Yet, without this investment capital, second-stage development may never be achieved.

It is for this reason that the House passed H.R. 9370 which directed the Secretary of Commerce, in cooperation with the Secretary of the Interior and the Secretary of Agriculture, to develop and implement a National Aquaculture Development Plan. To assist in providing the essential capital needed for the development of the U.S. aquaculture industry, H.R. 9370 directs the Secretary of Commerce to guarantee loans for the development of aquaculture facilities. The availability of Federal guarantees should provide the necessary incentive for private investors to funnel much needed capital into the aquaculture industry.

In my view, the new capital formation programs provided in H.R. 9370 are necessary, because existing Federal programs are inadequate. The resources of the Small Business Administration are stretched too thin. Reflecting this is the fact that in fiscal year 1975 SBA guaranteed only eight loans totaling $185,000 for aquaculture. In fiscal year 1976, the Small Business Administration guaranteed only two aquaculture loans for a total of $26,000. The Farmers Home Administration is likewise unable to meet the needs of the aquaculture industry. According to FHA spokesmen, FHA provides loans for established

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and proven enterprises. The aquaculture industry is in need of venture capital and, thus, generally does not qualify for FHA loans. This philosophy of the FHA loan guarantee program is reflected in the fact that in fiscal year 1975 and fiscal year 1976, the agency guaranteed a total of two loans for aquaculture production facilities.

Mr. Chairman, the adequacy of existing public and private programs for the assistance of the aquaculture industry will be a critical issue before your Committee. Although I have already addressed the questions of the adequacy of existing loan programs, I would like to also focus on the insurance provisions of the legislation which passed the House. During testimony before the Subcommittee on Fisheries and Wildlife Conservation and the Environment, certain witnesses suggested that the Federal Crop Insurance Corporation could meet the insurance needs of the aquaculture industry. Further investigation revealed, however, that the FCIC provides protection for crop losses only. Livestock losses, including aquaculture, are not covered by the program.

The next question is the availability of insurance from the private sector. Generally, the insurance industry can, and will, provide coverage for aquaculture facilities. This is why H.R. 9370 provides that federally sponsored insurance will be available only when such insurance is not available at reasonable rates in the private sector. It should also be noted that by letter dated October 18, 1977, the 145 member companies of the American Insurance Association endorsed the approach taken in H.R. 9370.

Mr. Chairman, a final critical issue which will be confronted by your committee is whether the Department of Commerce should be the so-called lead agency in the U.S. aquaculture development effort. In this regard, I would like to note that the future of aquaculture is in salt water and brackish water species which are within the subject matter jurisdiction of the Department of Commerce. Of the six high priority species currently identified for aquaculture development (salmon, marine shrimp, fresh water prawns, oysters, marine plants and lobsters) none are within the jurisdictional area of the Department of Agriculture, the other agency which is seeking to be named as the lead agency for aquaculture developmnt. Of the six medium priority species presently identified for aquaculture, only one (catfish) is the subject of a Department of Agriculture program.

The emphasis the various Federal departments have placed on aquaculture development is reflected in their budgets. In fiscal year 1975, the Department of Commerce expended $6.9 million on aquaculture development. The Department of the Interior spent $4.3 million. The Department of Agriculture spent $750,000.

By giving the Department of Commerce the primary responsibility for aquaculture development, H.R. 9370 reflects the fact that the future of aquaculture is in marine species. The legislation does recognize, however, that the Departments of the Interior and Agriculture have significant and important roles in aquaculture development and thus provides these departments with additional funds and authority to continue their existing programs.

One of the problems that has plagued aquaculture development in the United States has been the large number of Federal agencies which are involved in aquaculture development. Substantial benefits can be derived from providing coordination at the Federal level, and I believe that the Secretary of Commerce is best equipped to provide this coordination by virtue of her Department's subject matter jurisdiction over the species with the greatest aquaculture potential. To give each Secretary equal responsibility is to continue one of the basic problems plaguing the U.S. aquaculture effort.

Mr. Chairman, the enactment of comprehensive and effective legislation which will assist the U.S. aquaculture industry to realize its potential is one of the most significant things this Congress could achieve—it is my hope that this Committee will act expeditiously toward that goal.

Mr. LEGGETT. Mr. Breaux is here.

Mr. BREAUX. Yes, Mr. Chairman. I'm chairman of the House Oceanography Subcommittee. Congressman Jack Murphy and I are involved in legislation on the House side.

I have a statement that I would also like to have submitted for the record and I will summarize my comments.

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Mr. Chairman, we've been talking about this for 10 years and have had bills floating around the Congress at least 3 years. We've been working on it over on the House side and I know you've been working on it on the Senate side. But 10 years is long enough.

It's been pointed out to you this morning that we have been importing over 60 percent of all the fish products used in this country and it's costing us almost $2 billion a year to import these products.

It's costing us a lot more than that. We're importing about 50 percent of all the energy we use in this country as far as oil and gas is concerned, and the whole country is in an uproar.

The public really hasn't gotten the message that it's a very serious problem, and we're so dependent on foreign imports for fish products.

That's a very serious problem. I think that this legislation that you have today before you do present an opportunity to help correct that type of problem.

Now, as I said, we've been fooling with it for 10 years and one of the reasons I think no one has ever gotten their act together is because that we in the Government have something like 21 different agencies that are in some way or the other involved in aquaculture or fish farming or fish culture. That's 21 different agencies fooling with it, although they have done some good things in the past, I think—is a totally unacceptable way of handling any type of a program.

The legislation that we passed in February on the House side I think is a major step to try and put it all together and try to set out a plan of coordinaion.

Now you've heard a lot of problems today and a lot of talk about, well, we want it in Agriculture, we want it in Commerce, we want it in the Interior Department. The only one that hasn't requested it is the Department of Transportation. They may come in later and figure out it's a pretty good thing and want it put over there.

But I think what we've done in the House bill with Mr. Leggett and Mr. Murphy and myself, it's a very acceptable, fair compromise.

Someone has to be the lead agency. You can't have three or four agencies going out for an aquaculture plan.

What we said in our bill is that the Department of Commerce is going to be the lead agency, and with equal authority we're going to bring in the Department of Interior and the Department of Agriculture, and they're going to sit down together and come up with an aquaculture plan to try and identify the priority species, the ones that we should be concentrating on. And then, the department that has done the work, that has had the expertise with that particular species will then be in charge of carrying out that program.

We've had catfish farmers from my district raise a lot of concern about the fact that it should be in the Agriculture Department. Well, they worked with Agriculture in the past.

Under the House bill, I think, quite frankly, if it's passed as it is and with your suggestions, after the plan is devised, catfish farming, which basically, has been looked at and worked with and the research and development has been done by the Department of Agricul-

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ture, that would be continued. They still would be doing the work in catfish farming. That's what they have done in the past, but the difference would be that we have a major program, a coordinated program.

Now somebody, I think our good colleague, Senator Stone, that Mr. Leggett mentioned——

Senator MAGNUSON. There is a program in Agriculture now and we're not interfering with that at all. We're encouraging it.

Mr. BREAUX. Our legislation specifically says that any existing program will not be changed, any existing authority will be allowed to be continued.

Now someone pointed out to the National Academy——

Senator MAGNUSON. One other thing. I hear rumblings downtown that maybe we shouldn't do this because it might interfere with the administration's reorganization program.

Well, that's exactly what we're doing here.

Mr. BREAUX. We're helping them.

Senator MAGNUSON. We're helping them. This is exactly what we're doing. This is reorganization to the 6th degree and doing a good, efficient job on it for a purpose that's long overdue.

Well, this is the best. They should embrace this as part of their program.

Mr. BREAUX. Mr. Chairman, another point I want to make is that some people have referred to the National Academy of Science report—some have erroneously said it recommended the Agriculture Department as being the lead agency.

Well, NOAA, which is in the Department of Commerce, has done an excellent job in commissioning the National Academy to do the report. The report clearly does not say any agency or any department should be the lead agency. They just say that there should be a lead agency, and then makes some suggestions as to what that lead agency should do after someone determines who it should be.

Another point, I'm afraid—the Department of Commerce, because of the wisdom of the Office of Management and Budget, is going to have to come in any say, well, we don't want to appropriate or authorize any funds at this point in time.

I understand that. I disagree with it, but I'll give you a byline suggestion, Mr. Chairman.

If we do nothing else in this Congress other than pass a program coordinating aquaculture, even if we don't put a nickel in it, we're a lot better off than we are right now because we've got too many agencies spending money now.

Senator MAGNUSON. And on the amount of money involved, we can argue with OMB later on.

Mr. BREAUX. We'll take care of that when it gets to it.

Mr. LEGGETT. You take care of the money.

Senator MAGNUSON. That will be my job.

Mr. BREAUX. Mr. Chairman, my final suggestion is that Congressman Pritchard, who is the ranking minority member on our Subcommittee on Oceanography, is also strongly in favor. And I'll just close by saying somebody was talking about the ball being in somebody's park.

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The ball now is in the Senate's park. I think you have a real opportunity here to hit a heck of a home run with aquaculture legislation.

Senator MAGNUSON. Let me ask you this.

Undoubtedly, what we will do is take both the House bill and Senators Weicker's and Gravel's and put them all together and come out with probably some type of a committee bill. I would invite your suggestions as to how we should change the Senate bills, or some amendments you may think of for clarification, so that we can have a bill that we won't have too much problem with your bill in conference.

Mr. LEGGETT. I think our staffs can work together on that.

Senator MAGNUSON. You should get together and give us some ideas on it.

Mr. MURPHY. If we could get a copy of your bill, we'll be able to work on it.

Mr. BREAUX. Thank you, Mr. Chairman.

Senator MAGNUSON. Thank you very much.

Mr. MURPHY. Thank you, Mr. Chairman.

[The statement follows:]

STATEMENT OF HON. JOHN BREAUX, U.S. REPRESENTATIVE FROM LOUISIANA

Mr. Chairman and distinguished members of the committee, I am very pleased to be able to testify before you today regarding legislation to promote the development of Aquaculture in the United States.

Aquaculture has received Congressional Attention for the past decade and the first bill outlining a plan for its development was introduced during the 93rd Congress. It has not been, however, until the past two years that concentrated efforts have been made to assess the problems and needs of this relatively small industry. The House Merchant Marine and Fisheries Committee has held extensive hearings during the 94th and 95th Congresses during which testimony has been received from federal and state representatives, industry and academia. An extensive hearing record was compiled and recommendations made by the wide spectrum of witnesses were considered thoroughly and, in many cases, incorporated into H.R. 9370 which was passed in the House on February 15 of this year.

Although Aquaculture is a viable industry and contributes to the economy in many nations, the United States has been slow to develop aquaculture. Through our hearings we learned of the many problems facing the struggling industry. The recently passed bill fairly reflects the views of those testifying before our committee and one which we feel will help in solving many of the existing problems thereby encouraging the further development of Aquaculture in our country. With proper direction, coordination, and public support, it is my belief that Aquaculture has the potential to augment our dwindling natural fisheries resources, provide the means for producing protein rich food and stimulate the national economy by providing new job opportunities.

One reason Aquaculture has been slow to develop is due to the lack of coordination among the various federal agencies involved. At the present time, 21 agencies are involved to some extent and in many cases, their efforts overlap and responsibilities are unclear.

H.R. 9370 clearly sets out the responsibilities of each of the departments. The Department of Commerce was designated as the lead agency for coordinating Aquaculture activities. This provision providing for the coordination of activities, I feel, is one of the more important aspects of the bill. I would like to emphasize at this point that *no existing authority* is taken away from any agency involved in Aquaculture. It is the intention of our committee, and is clearly stated in the legislation, that the Secretary of Commerce, after consulting with the Secretaries of Agriculture and Interior, the chief executive officer of any other federal agency, any appropriate regional fishery management council, and any state agency affected by an Aquaculture Plan

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up a plan for the development of Aquaculture. We have covered every base imaginable and even included the provision to allow individuals to comment.

The development of the plan is significant in that "Priority Aquatic Species" are designated and will be the recipient of monies for research and development, technical assistance, demonstration, extension education, and training. The designation of priority species is determied by the extent of commercial aquaculture currently carried out, the extent of research and development which has been undertaken, and the time and resources which will be required to develop Aquaculture technology where such species can be cultured on a commercial basis.

Each department, singularly, jointly, or collectively will then be responsible for developing the program for each designated species. That is to say that after the Consultation, the determination will be made as to which department will be responsible for developing the complete program. In some cases, two departments will work together, such as developing a program for catfish. Traditionally, the Interior Department has provided the fingerlings through its fish hatchery program and the Agriculture Department has provided the technical assistance in the field through its extention service. Catfish farming has been one of the most successful ventures in this country due in part by the expert in-field assistance offered by the Department of Agriculture.

The Department of the Interior has the expertise in the development of fresh water species including trout and has several hatcheries located throughout the country. In the last few years the Department of Commerce, through its Sea Grant Program, has offered an invaluable service in the area of genetic and nutrition research relating to both trout and salmon which are proving to have great potential in culturing.

For the past ten years, the Department of Commerce has actively been involved in the culturing of shellfish. Its Sea Grant Program expends millions of dollars a year on research, the results of which are made available to the public upon request.

The need for coordinating activities at the federal level has long been recognized as is reflected in the memorandum of agreement between the Department of Commerce and the Department of Agriculture which was implemented in 1974. Another agreement between the Department of Commerce and the Department of the Interior was entered into in December of last year. Even with the memorandum of agreements, conflicts and duplication often arise. Paper work is often a burden and can tie up a research or development project for extensive periods of time. This is all the more reason for bringing all of the agencies involved with Aquaculture under one plan.

In addition to the lack of coordination at the federal level of government, many state and local agencies, regional commissions and universities are involved in aquaculture. Generally it is found that each entity proceeds in its own direction without regard for the activities of others. Again, at these various levels duplication often occurs. Funds are wasted and an atmosphere is often created whereby the usage of manpower is inefficient and ability is not maximized. Under the provisions of this bill, an aquaculture information center will be established to function as a national clearinghouse for the collection, selection, analysis, and dissemination of scientific, technical, legal, and economic information relating to aquaculture. We also will have the advantage of exchanging information with foreign countries. Japan, for instance, obtains half of its seafood requirements from Aquaculture production and can be a valuable source of information in the development of our own programs.

Another constraint which has confronted the industry is the inability to obtain adequate operating capital from the private sector. Although the small administration and the farmers home administration has had the authority to guarantee loans and, in some cases, make direct loans, their assistance has been inadequate.

For example, the small business administration has established an administrative limit of $150,000 on most direct loans and guarantees. Given the fact that an Aquaculture facility can cost several million dollars, it is clear that existing SBA programs do not provide an adequate source of investment capital. In 1975, eight regular business Aquaculture loans were made totaling $185,000 and only two such loans totaling $26,000 were made in 1976.

Furthermore, Aquaculture loan programs administered by the Department of

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Agriculture are restricted to businesses where the technology is established and proven. Thus far, Aquaculture technology has been established for only a very few species, and therefore, the number of loans the department has made to this industry is extremely small. For example, FHA makes farm ownership and operating loans to farmers for the production of fish, but only under controlled conditions such as in ponds and pens. Operating under the existing system makes it impossible for new ventures to emerge. The guarantee loan provision of our bill allows individuals to obtain loans for Aquaculture facilities, stock and operating expenses through local cooperating banks. In order to protect the farmer's and local bank's investment and create an atmosphere of security, the Bill also provides a disaster loan program and an insurance program.

A direct disaster loan can be made to any person if an aquaculture facility owned by that person is damaged or destroyed as the result of a natural disaster or if the stock of an aquatic species at the facility is damaged as a result of a natural disaster or by disease, pollution, or contamination not caused by the owner's negligence.

One of the most sought after provisions of the bill was one providing for a general insurance program. Broad, general coverage has not been available on the open market. Only one company, Lloyd's of London, offered coverage for loss of stock and was prohibitively expensive for the average farmer. It was generally felt that if insurance coverage could be obtained, loans for construction and operating capital would be easier to get from the private sector.

We generally believe that we live in a country of plenty, that our resources are almost unlimited. Now, however, we find the more desirable fisheries resources off our own coasts are being harvested at or near maximum sustainable yield. In recognition of this we recently extended our fisheries jurisdiction to 200 miles to regulate the taking of specified species and to allow U.S. fishermen to increase their landings without competition from foreign countries. Time is needed to replenish the natural stock and in the meantime we will be compelled to import an even greater amount of fish.

Presently, we import in excess of 50 percent of our fish and seafood requirements. It is ridiculous for a country bordered by two oceans, a gulf and having such an extensive river system to be importing this amount of fish and shellfish to meet its requirements.

It has already been proven in this country that Aquaculture can supplement natural stocks. Salmon produced in publicly supported hatcheries on the Columbia River represent more than one-half of the salmon caught in that large river system. The eggs are hatched and the fish are fed until they grow to suitable size to be releasd to the wild. The released salmon feed off natural resources until maturity when they return to spawn and are caught by commercial fishermen or for sport.

All of the trout purchased in our local markets are products of Aquaculture. The market for trout already exists and this industry can easily expand.

Catfish is another species that is raised by large scale production and is commercially successful. There are approximately 3,000 catfish farmers located in 42 states. The larger, more productive farms are located in the warmer climates of the southern states and account for 80% of the catfish cultured.

In my home state of Louisiana, crayfish farming is an integral part of our local economy. Local landowners produce 99 percent of the crayfish in the United States, 85% of which is consumed within the state. In south Louisiana there are some 40 processing plants providing jobs for hundreds of people.

So, now where would we in the United State be if it were not for Aquaculture? Would we be importing a larger quantity of our salmon and all of our trout, catfish and crayfish, It is apparent that Aquaculture can be a viable industry. It can and does contribute to our food supply. It can and does create new job opportunities. Other species can be cultured on the same basis with additional research and technical know-how. All the industry needs now is support.

Traditionally, this country has been a beef-eating Nation and public support for fish farming has been lacking. People are, however, becoming more increasingly aware of the high protein and low fat content in fisheries products and it is estimated that by the year 2000 the domestic demand will increase 80 percent.

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Fish production has a relatively low energy requirement when compared to other food products such as beef thereby making it more affordable. The conversion ratio for species such as trout and salmon is approximately 1.1 pounds of dry food to one pound of fish product compared to 10 pounds of food to one pound of beef. One published document reports "that one acre of a good estuary area can produce 100 tons of seafood, while one acre of top quality pasture can yield only 100 to 250 pounds of beef". It makes sense then that throughout the world people are turning to Aquaculture to tap additional food resources.

In many instances Aquaculture has proven itself to be a commercially profitable industry providing new job opportunities for hundreds of people. Expansion of the industry can provide thousands of new jobs, augment our natural fisheries stock and increase the domestic catch by our fishermen, and reduce the national balance of payments deficit by importing less seafood and fisheries products.

Although predictions had been made long ago that many of the natural fisheries resources off our coasts had reached near depletion, the fact remains that we waited too long in implementing legislation to protect them. We have statistics indicating that there will be a worldwide shortage of fisheries products within three to ten years. The opportunity is present to plan ahead and be prepared rather than having to react to a crisis at a later date.

H.R. 9370 received wide support in the House and it is my hope that the Senate's reaction will be as favorable.

I will be happy to answer any questions you may have regarding the legislation at this time and once again, thank you for inviting me to testify before you today.

Mr. LEGGETT. I'd also ask that the Sea Power article which just came out be considered for insertion in the record.

Senator MAGNUSON. We'll print that in the record in full.

[The article follows:]

THE PROMISE OF THE SEA—A NATIONAL PROGRAM IS NEEDED TO HARVEST THE RICH CORPS OF AQUACULTURE

(By Ellen D. Bottiny, assistant editor)

Americans consumed over 2.5 million pounds of seafood in 1975.

By the year 2000, U.S. consumption of all types of fish and shellfish combined could increase by another 80 percent, according to present estimates.

Moreover, if already existing technology were efficiently used and if enough political effort and funding resources were dedicated to the development and production of food from the sea, the projected increase could be even higher, and most of it could be home grown.

THE MOST OVERNOURISHED NATION

The fact that another major, and as yet largely untapped, nutritional resource exists does not, of course, mean that the most overnourished nation in the history of the world will take the steps necessary to harvest that resource.

Other countries have not been as fortunate in fooding their people. For that reason alone the overall global demand for fish and fish products is expeced to rise sharply in the foreseeable future as the world's nations search for viable new and/or improved methods of developing high-protein, energy-efficient food resources. If they do not, the prospect is that diminishing land resources and expanding populations will combine to cause food shortages which, now periodic, would soon become pandemic.

One answer to the world's future food problems is aquaculture, or "fish farming"—the human-controlled cultivation and harvest of both freshwater and marine aquatic species.

Surprisingly, although blessed with long coastlines and an intricate network of rivers, lakes, and estuaries, the United States currently imports over 60 percent of its seafood—at an annual cost of approximately $2.2 billion (including $800 million for fish potentially harvestable by U.S. aquaculture). The implementation last year of a 200-mile offshore fishing zone probably will increase the U.S.

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catch of natural fish stocks, but most experts believe more substantial long-term increases—for the United States as well as for the entire world—are possible only through the conscious and continuing scientific application of technology to: (1) make possible a substantial increase in the fish population itself; and (2) devise economical methods of harvesting the expanded fishery stocks which would result.

U.S./PRC EQUALS 1/50

Aquaculture in the United States is at present still only in the embryonic stage, accounting for a meager 3 percent of the country's annual fish production—compared with an average of 10 percent of total fish production in most other nations and reaching a high of 40 percent in some areas of Southeast Asia.

Mainland China produces by aquaculture more than 50 times the aquaculture production of the United States; Japan, 11.5 times that of the United States. Aquaculture also is an increasingly important industry in such diverse countries as Czechoslovakia, the Soviet Union, India, Israel, and Poland.

Closer to home, both Canada and Mexico have recently launched ambitious aquaculture programs. Partly because of such surges of activity, total worldwide aquaculture production has, not surprisingly, more than doubled in the past five years—U.S. aquaculture production has remained relatively static during the same time frame.

Despite that poor relative showing, U.S. aquaculture statistics are impressive in absolute terms. Currenly, the U.S. aquaculture industry annually produces: 48 million pounds of catfish; 2.6 million pounds of clam meats; 10 million pounds of crayfish; 17,000 pounds of freshwater prawns; 20 million pounds of oyster meats; one million pounds of pen-cultured salmon (fish are reared in floating net enclosures to a marketable size of about 12 ounces); 60 million pounds of hatchery-released salmon (fish are released into the ocean as juveniles and harvested as adults when they return to spawn); 800,000 pounds of shrimp; and 30 million pounds of trout.

Interestingly, very little of the trout available in U.S. markets today comes from fresh mountain waters; most domestic trout are now carefully bred, fed, harvested, and packaged on huge trout farms in Idaho and Montana—there are smaller farms operating in Washington, Oregon, California, and a few southern states.

Another success story: Salmon-release programs, which began in California and Oregon more than 100 years ago, now account for more than half of the coho and chinook salmon caught in the Columbia River system in the northwestern United States.

ADEQUATE TECHNOLOGY AND "HIGH-RISK" SPECIES

Fortunately, artificial spawning, essential to successful aquaculture, poses no problem to trout or salmon farming. With nearly 100 hatcheries on the Pacific Coast, therefore, experts from the National Oceanic and Atmospheric Administration (NOAA) confidently estimate that aquaculture production of pen-reared salmon could increase from one million pounds in 1975 to more than 20 million pounds by 1975, and production of ocean-ranched salmon from 60 million pounds in 1975 to 100 million pounds by 1985. There are two conditions: certain production problems have to be solved (improvements are still needed in feeding, disease prevention, incubation facilities, and methods of rearing larvae), and markets must remain attractive.

U.S. aquaculture technology is considered adequate for the profitable farming of—in addition to salmon and trout—catfish, crayfish, baitfish, ornamental fish (such as goldfish), and oysters. Improved technology is necessary, however, before it will be similarly profitable to farm the popular species of marine shrimp, lobster, and pompano and other marine finfish.

A good example of a species in the early "high-risk" stages of aquaculture development is the aforesaid marine shrimp culture of which began in Japan in the 1950s and has been attempted in the United States with only limited success. Using methods developed by Japanese scientists several U.S. companies are raising shrimp larvae in captivity and growing the juveniles to market size in seawater ponds. Shrimp farmers face numerous problems however which have resulted in high production costs and many unprofitable ventures.

One of the more pressing such problems is obtaining egg-bearing females. Because of the difficulties in getting shrimp to mature and spawn in captivity,

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shrimp farmers must capture egg-bearing females at sea and take them to hatcheries, where spawning is then induced. But that procedure is costly, even when the fishing grounds are near to the hatchery. In addition, wild spawning limits the genetic improvements that could be made with a domesticated species.

Future research and study of culture systems undoubtedly will improve methods both of collecting females at sea and of rearing larvae, and should ultimately perfect the maturation and mating technology of cultured marine shrimp. With good reason for optimism, therefore, NOAA said in its Aquaculture Plan (May 1977) that U.S. marine shrimp production by aquaculture, currently about one million pounds, will remain stable until about 1980, when "technology should permit a rapid expansion. . . . By 1985, shrimp production from private aquaculture in the United States could exceed 15 million pounds."

ISOLATED BREAKTHROUGHS

Those encouraging statistics are merely projections, however, and are dependent entirely upon improved technology, federal support and funding, and better coordinated leadership in the aquaculture community. Moreover, despite such isolated breakthroughs, the overall promise of aquaculture as a major food source has received very little serious attention in the United States.

That situation is slowly changing, however. A study (released in January) which was conducted by the Committee on Aquaculture of the National Research Council (NRC) estimates that, with proper support, world aquaculture production, currently about six million metric tons, could increase more than eight-fold by the year 2000. U.S. aquaculture, which currently produces about 65,000 metric tons annually, or about 1 percent of the world total, could increase nearly fifteen-fold in the same time frame, the Committee said.

Undertaken at the request of NOAA, the definitive 125-page study, "Aquaculture in the United States"—available from the National Academy of Sciences. Printing and Publishing Offices, 2101 Constitution Ave., N.W., Washington, D.C. 20418—found, among other things, that, compared to other food production systems, aquaculture is receiving considerably less attention in the United States than it merits, and that federal support has been minimal, mostly in the form of assistance from the Sea Grant program established in 1966 under NOAA jurisdiction.

After analyzing in detail all aspects—production, technology, economics, and administration—of U.S. aquaculture, the Committee concluded that "Advancements are needed in all areas, but for overall progress the essential requirements are *policy decisions* and *administrative actions* [emphasis added]."

The Committee was optimistic that, in the long term, "aquaculture will be a means of increasing food supplies [and] . . . has the potential to contribute to increased food production," and predicted that a critical need for food in the future will ultimately provide the required motivation for more serious development of the U.S. aquaculture industry.

PROBLEMS AND SOLUTIONS

Until now, the principal U.S. interest in fish farming has been motivated primarily by economics and the potential for increased income for fish farmers.

The main intent of the NRC study was, however, to identify the problems facing the aquaculture industry today and to make recommendations for the solution of those problems. To that end, the Committee identified four major areas (production systems, science and technology, business and economics, law and administration) where investment of additional resources and further research would be most valuable in the development of U.S. aquaculture.

The gist of the more important NRC findings and recommendations in each study area:

Production systems

The study recommended that "priority consideration" be given to:

Improved technology for rearing cultured species during the larval and juvenile stages;

Improved technology for formulating, processing, and delivering both natural food and artificial feeds for cultured species; and

Construction of appropriate demonstration facilities.

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Science and technology

"Although the primary constraints on current aquaculture systems are not scientific and technical," the study said, "grains from scientific and technical research can contribute to improving the performance of the system and increasing the profitability of commercial ventures. . . . Such information would also enhance the possibilities of developing aquaculture for additional species."

The Committee cited the following areas where improved technology is needed:

Nutrition.—Information on the specific nutritional requirements of culturable species during various stages of their life cycles would greatly help survival rates, growth rates, and disease resistance.

Environmental control.—Extensive research is needed on such complex variables as water quality, soil characteristics, weather conditions, and tides, and how either singly or collectively they affect the growth and survival of various cultured species.

Genetics.—Research would help develop strains possessing more commercially desirable characteristics, preserve natural and domestic stocks, and improve the general quality of the product. The study acknowledges that the world aquaculture industry is only beginning to realize the potential of genetic improvement in aquatic species, and has a long way to go to duplicate the success that has been demonstrated in agricultural breeding.

Disease control.—Increased knowledge of disease organisms would facilitate the development of appropriate methods to combat aquacultural diseases.

Business and economics

Aquaculture is faced with major constraints economically as well as scientifically. Economic analyses and the use of forecasting models dissecting such variables as demand, production, marketing, and finance, the study suggests, would include the productivity and overall efficiency of aquaculture operations, as well as encourage a better understanding of markets. The limited availability and resulting high prices of both purchased inputs (such as farm sites, operating capital, labor, and trained managers) and operating inputs (feed, water, energy, seed, and chemicals), and the large quantity of both which are needed for profitable aquaculture production are key inhibitors to industry growth. Moreover, once a product reaches the market, low prices and sometimes limited demand impose further economic pains.

"To be economically viable," the Committee pointed out, "an aquaculture venture must be able to produce an aquatic biological product at a competitive cost and be able to sell it at a reasonable profit. Before such a state is reached, much time is usually required for basic scientific research to result in the development of improved technology and for such technology to become commonly used within the industry." Aquaculture in the United States is still, relatively speaking, in the infant stages of its development and can be compared to the state of U.S. agriculture more than 100 years ago. Adequate financing, similar to that given agricultural programs—"the great success [of which] . . . is largely the result of more than 100 years of research supported by billions of dollars of public funds"—would of course greatly increase the possibilities of similar successes for aquaculture.

The Committee recommended:

Research to determine whether markets exist for species currently under consideration for aquaculture—the research would include study of such variables as price, consumer income levels, prices of other foods, and the size of the consumer population. Results would allow policymakers and planners to formulate a viable aquaculture program;

Federal support for on-going and future research in aquaculture. The panel said aquacultural programs should be eligible for assistance from the Small Business Administration and the Department of Agriculture, and that tax credits, insurance, depreciation, and amortization benefits available to other small businesses should be equally available to aquaculture; and

Research on: (1) the relationship between potential aquaculture products and required production costs; and (2) such related factors as the price of artificial feeds, losses from disease, costs of labor, and the availability of aquacultural sites.

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Law and administration

The Committee concluded that, for aquaculture to reach its full potential, "coherent support and direction from the federal government" is mandatory. Most current legislation affecting aquaculture is often inadequate to meet industry needs and, in fact, acts as a major constraint to effective development of U.S. aquaculture. Other laws—related to use of U.S. public waters, pollution, health, safety, and the environment—also have, thus far, worked in large part against the aquaculture industry, either by setting higher priorities for water use (such as recreation and navigation) or by escalating aquacultural costs. In addition, variances among state laws and disparities in the application of federal laws which affect the aquaculture industry impose further constraints. Aquatic farmers must comply not only with state and federal regulations, but also with local ordinances and, where applicable, international treaties. A sometimes bewildering variety of permits and licenses is necessary to the practice of aquaculture and very often the requirements for such permits, if not actually contradictory, involve a jurisdictional overlap and thus cause unnecessary confusion and delays.

One of the primary reasons aquaculture has developed so slowly in the United States, the panel said, is the lack of coordination among the more than 20 federal agencies currently involved in aquacultural activities. Such diffusion of effort results in much unnecessary duplication of activities and research. The Committee's final (and perhaps most important) recommendations, therefore, related to the responsibilities of "a lead agency" for acquaculture. On 28 September 1977 (during the course of the NRC study), the Food and Agriculture Act of 1977 (Public Law 95–113) designated the Department of Agriculture as the lead agency for aquaculture. The Committee recommended that the lead agency:

Take steps "to coordinate [aquaculture] activities among other federal agencies";

Annually submit to the President and the Congress "a report on aquaculture in the United States . . . containing a review of existing problems, progress to date, the allocation of funds, and an outline for action";

Develop a "National Aquaculture Plan" which would integrate and coordinate the assets, skills, and resources of all federal agencies involved in aquaculture to any appreciable degree; and

Disseminate information about federal and state permits and licenses for aquaculture and develop guidelines for state and local use in the enactment of laws and regulations which affect aquaculture.

THE 9370 SOLUTION

Happily, solutions to many of the problems addressed in the NRC study are incorporated in H.R. 9370, a bill introduced in the House of Representatives on 28 September 1977 by the House Merchant Marine and Fisheries Committee.

"The National Aquaculture Organic Act of 1977," which prosaically calls for "the development of aquaculture in the United States," overwhelmingly passed the full House on 15 February by a 234 to 130 vote. Several weeks of hearings on draft versions of the legislation were held last year—in Honolulu; Washington, D.C.; Seattle; Newport, Ore.; and Rockland, Maine—by the parent panel's Subcommittee on Fisheries and Wildlife Conservation and the Environment, meeting jointly with the Committee's Subcommittee on Oceanography.

Most of those testifying during the hearings expressed strong support for the legislation, but a number of witnesses feared that federal assistance for aquaculture would interfere with commercial fishing and ultimately hurt the private fisherman. Representative Paul S. Trible, Jr. (R–Va.), a member of the Fisheries Subcommittee, commented on that fear in his statement before the House on 15 February: "It is important that a number of provisions are included to protect our present fisheries industry. . . . The bill directs that in providing aquaculture aid, the government shall give preference to commercial fishing cooperatives and associations employing 40 persons or fewer. . . . [and] contains language declaring that the aquaculture program is intended to augment, not supplant, the catch of commercial fishermen."

Briefly, H.R. 9370 provides for the development of a comprehensive U.S. national aquaculture program. Representative Robert L. Leggett (D–Calif.), chairman of the Fisheries Subcommittee, summarized (during hearings on the bill and later, before the full House on 15 February) the Committee's intent: "[the bill] has as its stated purpose to promote commercial aquaculture in the United

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States by declaring a national aquaculture policy, by establishing and implementing a national plan in order to develop programs and encourage activities which will result in the coordination of domestic efforts, the increased availability of fishery resources, and the creation of new industry and fishery-related job opportunities."

EMPHASIS ON "PRIORITY SPECIES"

The proposed legislation directs the Secretary of Commerce, in consultation with the Secretary of the Interior and the Secretary of Agriculture, to establish—within one year—a national aquaculture development plan, identifying each aquatic species which has a high potential for commercial culture. Detailed development plans for each such "priority aquatic species" are to accompany the national plan and identify those actions the Secretary deems necessary for the successful culture "of each such species on a commercial or other basis."

The "actions which the Secretary determines should be undertaken . . . shall include" among other things, according to Section 4 of H.R. 9370: (1) research and development related to facility design and operation, water quality management, nutrition and the development of economical feeds, fish genetics, disease control, fish processing, and market development; (2) identification and analysis of legal or regulatory constraints which might adversely affect the culture of aquatic species; and (3) "the construction, purchase, lease, or acquisition of necessary developmental aquaculture facilities."

To insure that the actions specified in the national aquaculture development plan are being accomplished "on a successful and timely basis," H.R. 9370 provides further that the Secretary of Commerce annually review the aquaculture plan for each priority species, and authorizes him to modify or cancel various sections of the program as needed.

Another important provision, and one for which the need was expressed often during the hearings by the two Subcommittees, establish an Aquaculture Informational Center to function as a national clearinghouse for aquaculture, collecting and distributing relevant scientific technological, economic, and legal information.

LOANS AND LOSSES

Yet another section of the bill, and one considered vital to the development of U.S. aquaculture, establishes a loan guarantee program, to be administered by the Secretary of Commerce, which would provide the capital necessary for the construction and operation of aquaculture facilities as well as for the acquisition of stocks of aquatic species. During the Subcommittee hearings it was pointed out that the Small Business Administration (SBA), the federal agency charged with aiding small business ventures, imposes an administrative limit of $150,000 on most direct loans and guarantees.

Because aquaculture is a capital-intensive industry, with the cost of facilities often amounting to several million dollars, most of those in the industry have thus been effectively barred from SBA assistance—in 1975, only eight aquaculture loans, amounting to a collective total of $125,000, were made by the SBA; in 1976 the SBA granted a total of two aquacultural loans amounting to $26,000 combined.

And there's little help elsewhere. Loans from the Department of Agriculture are restricted to businesses with established and proven technologies. Because aquaculture technology has been established for only a few species, very few USDA loans are made to the industry.

Protection against loss of property and/or stocks because of natural disasters is also provided for in a disaster loan program authorized by H.R. 9370. The bill also authorizes establishment of a federal insurance program for aquaculture, if such insurance is not available at reasonable rates in the private sector.

Finally, the most important substantive provision: H.R. 9370 also authorizes appropriations amounting to $822 million (not including any funding for the insurance provision) to carry out the programs mandated by the bill for the five years following final passage and signing into law. (That sizable total includes "not to exceed $500 million" for guarantee loans and "not to exceed $250 million" for disaster loans. The actual net cost of the bill "to the Federal Government . . . for the current fiscal year and for the next five succeeding fiscal years" is estimated to be $268.8 million, about $45 million or so per year—a relatively modest sum by today's standards for the development of a major new industry with such far-reaching potential for the future.)

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Included in the 9370 cost projections are: for the Department of Commerce—$4 million for fiscal year 1979, $15 million for fiscal year 1980, and $17 million for fiscal year 1981; for the Departments of Interior and Agriculture—$2 million each for fiscal year 1979, $7.5 million each for fiscal year 1980, and $8.5 million each for fiscal year 1981.

An important point emphasized by committee members: Although the proposed legislation delegates most of the authority and responsibility for aquaculture development to the Department of Commerce, it does not pre-empt any existing law, such as the previously mentioned Food and Agriculture Act of 1977—which, although it designated the Department of Agriculture as lead agency for aquaculture, did not identify or fund any specific program for aquaculture development.

Representative Leggett explained the differences between the two bills as follows: "[The Food and Agriculture Act of 1977] did not provide for any funding . . . [or] for the development of an aquaculture program by the Department of Agriculture. It did not provide for any grant program, for any loan program, or for any reinsurance program. . . . We do not intend by this bill to take away any jurisdiction that the Department of Agriculture has. . . . The Department of Commerce is the *coordinating agency* for aquaculture [emphasis addded]."

Whether or not the United States will, at long last, implement a national program to develop aquaculture to its full potential is now up to the Senate. H.R. 9370 has been referred to the Senate Commerce Committee and as of late March was scheduled to go to the Senate floor on 17 April.

The bill's supporters believe the urgent need for a major national effort to tap the food resources of the sea is self-evident. With the world population expected to double between the years 1975 and 2000, they say, it would be unrealistic—and, indeed, culpably negligent—to postpone any longer the development of the additional protein resources so abundantly available and already so urgently needed.

Senator MAGNUSON. All right. Mr. Walsh.

STATEMENT OF JAMES P. WALSH, DEPUTY ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, DEPARTMENT OF COMMERCE; ACCOMPANIED BY TERRY LEITZELL, ACTING ASSISTANT ADMINISTRATOR; AND DAVID WALLACE

Mr. WALSH. Thank you very much, Mr. Chairman.

With me this morning, on my right, is Mr. Terry Leitzell, who is the Acting Assistant Administrator at NOAA for Fisheries; on my left is Mr. Dave Wallace, who is presently heading up our international fisheries section and who has been intimately involved in aquaculture for some time.

We welcome the opportunity to appear before the committee this morning to comment on the aquaculture bills that you are now considering.

H.R. 9370, which has passed the House, would require the Secretary of Commerce, after consultation with the Secretaries of Interior, Agriculture, and other bodies, to establish a national aquaculture development plan. This plan would identify aquatic species which could be cultured. It would include an aquaculture development program for each priority species identified. The bill would provide for advisory and technical services, the establishment of an aquaculture information center, and the construction and operation of aquaculture and development facilities to assess the economic feasibility of aquaculture systems. Provision would be made for a system of collection of aquaculture production statistics and a mechanism for collecting data on foreign aquaculture. The bill would also create

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an interagency committee that would provide authority for grants and contracts and would authorize a guarantee of obligations.

S. 2582, introduced by Senator Weicker, is similar but has some differences. The Department of Commerce under this bill will be given sole authority for the program. Senator Weicker's bill does not include a provision for disaster relief loans, and the insurance program would cover only essential stocks and not facilities.

S. 2762, introduced by Senator Gravel, is basically the same, with the principal difference being the provision describing the formulation of a national aquaculture development plan.

Senator MAGNUSON. I notice this suggestion on regional authorities. How would you define a region?

I know it would be geographical, but would it relate to a region as to the species or stocks?

How would you define it?

Mr. WALSH. Senator, I think that the regions would not be unlike those contemplated under the Fishery Conservation and Management Act. Regional committees would develop programs with local input rather than have a program developed that is based on analyses made in Washington, D.C.

Senator MAGNUSON. Well, it would be similar to the regional councils under the 200-mile limit, wouldn't it?

Mr. WALSH. I believe that's the model that was used.

Senator MAGNUSON. Because they would have to work with those councils, too, wouldn't they?

Mr. WALSH. I suspect so.

Senator MAGNUSON. All right. I suspect so, too. I'm not looking forward to that very much.

Mr. WALSH. Based on present stock estimates, Mr. Chairman, the amount of fish that could be harvested in the ocean, as you know, at optimal sustainable levels is limited. The total amount may be considerably less than twice the present world catch of 65 million metric tons, or, as most estimates put it, about 150 million metric tons as the total amount that may be taken out of the ocean.

At the same time, the demand for fish and for animal protein, in general, particularly in the Third World nations, is projected to more than double in just a few decades.

On a worldwide basis aquaculture produces about 6½ million metric tons, or 10 percent of the world's fish supply. However, this amount did double in the last 5 years. For example, Japan's aquaculture production increased from 110,000 metric tons in 1971 to 500,000 metric tons in 1975. Israel obtains almost half of her fish from culture, and China may also approach this proportion.

Senator MAGNUSON. I believe that's true in China, I'm sure you have no figures on that, but it must come pretty close to that. They're past masters at it. They've been working on it for so long.

Mr. WALSH. We're in the process of selecting some scientists to go to China in the near future to deal with a number of subjects, including this one.

Worldwide potential for aquaculture is great. Production may reach as high as 50 million metric tons by the year 2000.

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In the United States aquaculture production is about 65,000 metric tons, or 3 percent of our fish supply. Although this is a significant level of increase compared to the 1950's, aquaculture production generally has remained stable over the last few years.

If the United States were to achieve the world average production of 10 percent of total production of fish, the amount would be significant and would be on the order of about 254,000 metric tons. With proper management, U.S. aquaculture production could reach 1 million metric tons by the year 2000. Recreational fishing, employment, and other important national values would increase in the same order of magnitude.

Senator MAGNUSON. I think we should emphasize that point. I didn't with the other witnesses. We were talking more about consumption of fish, commercialization, marketing conservation, and things of that kind. But a lot of this is going to be to the great benefit of sports fishermen and recreational fishing.

Mr. WALSH. Most particularly, ocean ranching, Senator, provides an opportunity for increasing that activity.

Many analyses of U.S. aquaculture, including the recent study by the National Academy of Sciences, have concluded that aquaculture has developed more slowly in the United States than in other advanced nations, but some cultured species are being developed and expanded on a profitable basis. U.S. aquaculture has the potential in the long run to play a significant role toward providing increased food production. In order to achieve this potential, however, advances are needed in many areas, particularly in regards to political and administrative areas.

Mr. Chairman, the administration supports the development of the aquaculture industry in the free enterprise market, and believes that policies and programs should be responsive to the needs of this industry in a manner which encourages a timely, balanced, and cost-effective development, responsive to market demands, priority use of our coastal resources, and health and environmental concerns.

The Department of Commerce and its predecessors have been active without interruption for over a hundred years in research and development, training, information transmittal, and many other phases of aquaculture. These activities have been primarily in the marine field.

The U.S. Commission of Fish and Fisheries, the first ancestor of NOAA's National Marine Fisheries Service, was established in 1871 with the express purpose of operating hatcheries to augment fish stocks of the east coast which showed signs of depletion.

NOAA and its predecessor agencies have been most active and successful in three kinds of aquaculture: (1) salmon and trout; (2) mollusks—mostly oysters and clams; and (3) shrimp, both fresh and marine shrimp—and the freshwater shrimp is referred to as "macrobrachium." A considerable number of other animals and plants have also received the attention of NOAA.

NOAA and other agencies have worked jointly with the States to develop hatchery systems for restocking depleted salmon resources. Over 100 Federal and State hatcheries release young salmon which

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provide more than a quarter of the commercial and recreational catch of the Pacific Coast.

In recent years, NOAA, through NMFS and the sea grant program at the universities on the west coast, has developed successful techniques which permit pen and raceway raising of salmon on a profitable commercial basis.

Furthermore, the same salmon research over many years past has been the basis for the promising ocean ranching industry that is already established in Alaska and Oregon and, to a smaller extent, by the Indians in Washington State.

Oyster work and, to a lesser extent, research and development on clams and mussels has been carried out by NOAA and its predecessor agencies for years. Much of the necessary life history information and data on nutrition, diseases, and other biological aspects of the shellfish have been obtained in NOAA laboratories.

Further, a significant amount of the culture procedures have been developed by our scientists, mostly in direct cooperation with the industry. Much of the modern kinds of oyster and clam culture involving the full control of the life history that permits the production of brood stock and replaces the older and less efficient methods of obtaining young from wild stocks were developed in NOAA programs.

Shrimp culture is less advanced than that for the salmonids and mollusks. However, much of the U.S. shrimp culture, both in this country and in Latin America with U.S. capital, depends to an important degree on research conducted by NMFS or supported by sea grant.

The Office of Sea Grant supports a very large program in aquaculture research and development, about $4 million in Federal funds, roughly equivalent to funds also expended by the National Marine Fisheries Service. The scope and variety of the projects is wide, and about 30 universities are engaged in about 90 projects. Many advances have been made in aquaculture as a result of this work.

NOAA also supports aquaculture research and development projects in the States through grants under the Commercial Fisheries Research and Development Act of 1964 and the Anadromous Fish Conservation Act of 1965. Projects include work on freshwater shrimp, oysters, clams, abalone, polyculture of freshwater fish, and conservation, development, and enhancement of anadromous fishery resources. The combined programs support work in all 50 States and in many territories and possessions.

NOAA has consistently demonstrated interest in promoting aquaculture and its commercial potential in the United States. Ours was the first Federal agency to appoint an aquaculture coordinator. One of our major projects in recent years has been the NOAA aquaculture plan. This document is significant in the perspective it gives to this activity for our agency. NOAA has taken the lead in keeping abreast of foreign aquaculture, as well, and we have many scientists working with foreign nations in cooperative efforts.

Mr. Chairman, before I summarize the administration's views on the bill, I would like to discuss Federal program considerations

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which I consider particularly significant in the context of this legislation.

H.R. 9370 highlights in section 6 the need to increase the coordination among Federal agencies engaged in aquaculture. The creation of the Subcommittee on Aquaculture of the Interagency Committee on Marine Science and Engineering, referred to as ICMSE, has already provided highly valuable coordination. NOAA provided leadership in the establishment of this subcommittee, and supplies its present chairman, and that is Mr. Wallace. The subcommittee held its eighth meeting in March of this year. It has provided an exchange of results of programs and plans for the future. This kind of interagency committee will continue to promote the development of aquaculture in this country.

The existing subcommittee has created seven panels. As examples of the useful services, I would just like to briefly mention results in a couple of areas.

First, in regard to statistics, industrial development of aquaculture and the effective conduct of research by Federal and State laboratories or by academic or by commercial scientists is handicapped by the lack of, reliable statistics of production, manpower, acreage, and related data. The subcommittee panel on statistics of this interagency committee, consisting of experts from Commerce, Agriculture, and Interior, has developed plans for a system of aquaculture statistics. We believe this will be helpful to further development.

Second, the United States can also benefit by making use of the research and experience of foreign countries which have skills in aquaculture. The subcommittee's panel on translations authorized the translation of foreign literature, financing this by money made available by agencies to the translation service of NOAA's National Marine Fisheries Service. This program has resulted in the preparation of 49 translations that are completed or in process.

Third, NOAA has helped lay the groundwork for the preparation of a national aquaculture plan through its own independent activities and through cooperation with other Federal agencies. The NOAA aquaculture plan was issued last year after 3 years of concerted effort involving formulation and advice from scientific and industrial groups.

Information in the NOAA plan and much of the background and experience gained in its preparation can be applied to the development of a broader or overall national plan for aquaculture. The panel on planning of the interagency committee, consisting of staff from NOAA, Department of Agriculture, and Department of State, have produced a detailed outline for a national plan.

Fourth, those associated with U.S. aquaculture have recognized that legal and institutional barriers have constrained the commercial development of aquaculture and will probably be the major hurdles. The subcommittee's panel on regulations has recommended a preliminary study involving examination of the regulations imposed on aquaculture by Federal, State. and other agencies in a small area of the country as a trial before the national problem is addressed. The study will be pursued as a national project involving Commerce, Agriculture, and the Food and Drug Administration.

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Mr. Chairman, in our 1979 budget request, which is currently pending before your appropriations committee, we are asking for additional funds—about $1 million—to improve and expand our National Marine Fishery Service and sea grant aquaculture programs. With the additional funds we plan to improve the coordination and effectiveness of our existing programs, work with other concerned agencies in the Federal Government, develop a Federal aquaculture plan, provide additional research and advisory services to those individuals who are developing aquaculture programs, and conduct research in the most promising new areas for profitable aquaculture development.

We also plan to work closely with the States' coastal zone management programs to assure that as the coastal areas are allocated for various uses, the needs of the aquaculture industry are taken into consideration. In other words, in marine aquaculture we are addressing many of the concerns raised in the bills before you.

Mr. Chairman, the administration recommends against enactment of aquaculture legislation at this time. We concur that there is a need for better coordination of Federal aquaculture efforts through an interagency process which recognizes the expertise of each agency and overall tradeoffs with the food-production efforts.

For many years there has been a considerable effort in the Federal Government in the field of aquaculture. At this time there are some 16 Federal agencies conducting programs in support of aquaculture in the United States. However, studies, surveys, and congressional hearings have demonstrated that there are instances of duplication of effort and a lack of responsiveness to the needs of industry from current programs.

With the national need to make better use of our limited financial resources, it seems obvious to us that we should insure that there is a cost-effective aquaculture program for the United States.

This coordination concern is being considered in the President's reorganization studies, and we believe that it is premature for us to recommend a lead agency for aquaculture until the President has submitted his reorganization recommendations.

Presently, we and the Departments of Agriculture and the Interior have the major roles, which are reasonably well defined, and the interagency subcommittee can be used to coordinate the development of our programs and policies. In terms of a Federal role, we are opposed to the establishment of major aquaculture-specific financing, including loan, demonstration, and insurance programs. Although evidence indicates that existing Federal assistance programs and nongovernmental lending institutions have not been as supportive of aquaculture as is desired by the industry and interested groups, we believe that insufficient marketing, cost-benefit, and technology-assessment studies have been undertaken to justify providing this industry with major special Federal subsidies.

In certain cases, where the potential returns to the general taxpayer are very great and the risks are too high for industry to underwrite the front-end R. & D. costs, the Federal Government should provide such assistance. But with aquaculture, the potential payoff is a decade or two away, and significant benefits to the general

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taxpayer have not been demonstrated. Furthermore, a thorough analysis has not been conducted as to what changes could be made in existing financial programs to better assure that economically viable but risky aquaculture development projects are undertaken.

We presently believe that the principal role the Federal Government should play in the support of aquaculture in the United States is to conduct biological, engineering, and economic research and provide advisory services. These efforts should be made to address the complicated problems by fish farmers in their attempts to establish profitable businesses. However, the economic viability of aquaculture systems developed in the laboratory must be determined by industry with limited Federal assistance. We and our fellow Federal agencies are carefully scrutinizing all aquaculture efforts and will continue to assess the appropriate level of Federal involvement.

In connection with the development of a comprehensive Federal ocean policy, our national marine aquaculture goals, and the Federal role are high on our list of issues for further consideration. We expect that further policy alternatives in this area will be developed over the summer months and presented to the President for his decision later this year.

In summary, Mr. Chairman, we support the goals of these bills and are in agreement with you that the coordination and focus of the Federal aquaculture policies and programs should be better developed, especially in the research, regulatory, environmental, health, technology transfer, and advisory area. We believe that we are working toward improvement in these areas and appreciate your support. Nonetheless, at this time we cannot support the provisions in S.2582, S.2762, and H.R. 9370 which would establish major new financing programs. We believe that until a sufficient study has been completed which justifies a program expansion, current funding levels are adequate.

Mr. Chairman, I appreciate the opportunity to testify on these bills. I will be pleased to answer any questions you may have at this time.

Senator MAGNUSON. I thank you.

Mr. WALSH. Mr. Chairman, the administration supports increased activity with regard to aquaculture, as is evidenced by the fact that they have approved more money to NOAA to increase our aquaculture efforts. However, the administration is opposed to new programs involving increased expenditures in this area.

Senator MAGNUSON. Well, we won't necessarily increase the programs. We should take all the programs that are going on now and put them together.

Mr. WALSH. Mr. Chairman, that's one of the recommendations that was made, and we endorse that. Better coordination——

Senator MAGNUSON. You don't endorse the branching out of the House bill, the guaranteed loans and things of that kind that are in the bill yet? You say "yet", don't you?

Mr. WALSH. I say at this time.

Senator MAGNUSON. Did you testify that way before the House?

Mr. WALSH. Yes, we did.

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Senator MAGNUSON. And the House turned you down by a 2-to-1 majority, is that right?

Mr. WALSH. Apparently they voted——

Senator MAGNUSON. Apparently? The record's right there. What do you mean, "apparently?"

All right; I understand your position. It's a little bit different being on that side of the table.

Mr. WALSH. You can't tell me that, Senator.

Senator MAGNUSON. All right. Thank you very much.

Mr. WALSH. Thank you very much.

Senator MAGNUSON. Now we have the Assistant Secretary of Agriculture.

Do you have the same testimony as Mr. Walsh?

STATEMENT OF M. RUPERT CUTLER, ASSISTANT SECRETARY OF AGRICULTURE FOR CONSERVATION, RESEARCH, AND EDUCATION, DEPARTMENT OF AGRICULTURE; ACCOMPANIED BY RUDY SCHMITTOU, AQUACULTURE COORDINATOR

Mr. CUTLER. The bottom line's the same, yes, sir.

Senator MAGNUSON. Why don't you put it in the record, then?

Mr. CUTLER. We plan to do that.

Senator MAGNUSON. Did you testify in front of the House, and they turned you down, didn't they?

Mr. CUTLER. The response was the same as the Department of Commerce.

Senator MAGNUSON. Well, I have no further questions. Except, does the USDA suggest that we're doing enough now?

Mr. CUTLER. We don't think we're doing enough now, no, sir. We're asking for a $3.6 million increase in the 1979 budget.

Senator MAGNUSON. You have a program in aquaculture now, don't you?

Mr. CUTLER. Yes, we have quite a program involving several agencies.

Senator MAGNUSON. You didn't testify against that when that was up, did you? You weren't there then. I was.

Mr. CUTLER. I don't follow you, Mr. Chairman.

Senator MAGNUSON. In Agriculture they wanted the program that's going on now, didn't they?

Mr. CUTLER. Certainly. It ties in very closely.

Senator MAGNUSON. They actually wanted it expanded to salt water.

Mr. CUTLER. We think it should be.

Senator MAGNUSON. You think it should be?

Mr. CUTLER. That's correct.

Senator MAGNUSON. Well, what's the gist of your testimony? Tell me.

Mr. CUTLER. Well, we oppose the bill, but we think that the Department of Agriculture should continue its work on aquaculture because aquaculture is, to a large extent, a food production system; and the Department of Agriculture's technical assistance——

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Senator MAGNUSON. You're talking about fresh water?

Mr. CUTLER. That's where USDA's experience lies.

Senator MAGNUSON. Most all of it is in fresh water.

Mr. CUTLER. We also work with the sea grant program in the Department of Commerce.

Senator MAGNUSON. The sea grant program has done research on all of these things.

Mr. CUTLER. The cooperative extension service, a mandated USDA program, is involved in communicating marine biology research information but is not directly involved in the research programs.

Senator MAGNUSON. Well, I'll read your testimony. It just seems to me that you're telling us what you're doing now, which is about the same as what the bill suggests we do more of. Isn't that right?

Mr. CUTLER. That's right.

Senator MAGNUSON. All right. Thank you very much.

Mr. CUTLER. May we submit the details of our current program?

Senator MAGNUSON. Yes. I know you have a good program. I think an excellent one. And you have emergency loans involved?

Mr. CUTLER. The Farmers Home Administration? Yes, sir.

Senator MAGNUSON. Does that involve the ponds, too?

Mr. CUTLER. Yes, that's the soil conservation service program.

Senator MAGNUSON. Which is in Agriculture?

Mr. CUTLER. That's correct.

Senator MAGNUSON. And naturally, you'd be the lead agency in that.

Mr. CUTLER. Yes.

Senator MAGNUSON. Because that was the first plan on agriculture. That goes way back to the Soil Conservation Act, which was enacted many years ago.

Mr. CUTLER. As a matter of fact, Mr. Chairman, we provide assistance on fish management in 37,923 ponds.

Senator MAGNUSON. Yes. And it also has water quantity and soil information, things of that kind?

Mr. CUTLER. And provides technical assistance, of course.

Senator MAGNUSON. So you do have an ongoing program in aquaculture now, and you have Farmers Home Administration financing too, don't you?

Mr. CUTLER. That's correct.

Senator MAGNUSON. Yes. So you have the same program going on. You think that's enough?

Mr. CUTLER. We're looking forward to working closely with the Department of Commerce and Interior on a coordinated program.

Senator MAGNUSON. How are you going to get involved in salt water aquaculture?

Mr. CUTLER. The Forest Service, as you know—the national forests in southeast and south-central Alaska, where aquaculture installations are present and where many more are planned. So from the standpoint of coordination between our Forest Service land use plans and the aquaculture programs that surfaced during the surface zone management plan, we're involved in providing for Alaskan aquaculture facilities.

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Senator MAGNUSON. You have to work with the coastal zone management people on this, too?

Mr. CUTLER. Right. The soil conservation assists in planning, too.

Senator MAGNUSON. But I've never heard of the Forest Service being involved in this.

Mr. CUTLER. It provides the sites, since it owns the lands along the coast in Alaska.

Senator MAGNUSON. Some of the land around the coast, not all of it.

Mr. CUTLER. In southeast and south-central Alaska, most of it.

Senator MAGNUSON. All the southeastern part, I imagine, is Forest Service land, isn't it?

Mr. CUTLER. Yes, it's the Tongass and Chugach National Forests.

Senator MAGNUSON. Then you're involved in the sea grant program, which is mainly research.

Mr. CUTLER. Yes. This is a cooperative program. For the most part the Department of Commerce administers it. But in many instances, the sea grant program is also at the land grant institutions or agriculture experiment stations.

Senator MAGNUSON. Well, there's such a small amount in the sea grant program that the funds end up as some little project, maybe one or two people taking it on in grants, for example in salmon and other research. But the soil conservation service does give advice on loans, for example.

Mr. CUTLER. We have quite a bit of aquaculture research under way that's not associated with sea grant. Of course, it's mainly fresh water. But Auburn University, for example, has a lot of leadership in this program. When they take a look at some stocks or species, then they give you the information on what will be well worth it in a fresh water pond, what could be done.

Senator MAGNUSON. All right. Well, we'll put your statement in the record in full, and if we do have a program, it is my understanding that Agriculture does not want Commerce to be the lead agency; is that correct?

Mr. CUTLER. We read the Food and Agriculture Act of 1977, passed last year by this Congress, as making the Department of Agriculture the lead agency in aquaculture. That's what the law says.

Senator MAGNUSON. I'm not too familiar with that part of it.

Mr. CUTLER. We'd be happy to provide you.

Senator MAGNUSON. Please insert that in the record where it says that the lead agency for that part of the program that involves freshwater fish is the Department of Agriculture.

Mr. CUTLER. I can understand why you'd want to qualify it, Mr. Chairman. But it's not qualified in the law.

Senator MAGNUSON. Freshwater fish. All right. Thank you very much, and we'll put your statement in the record.

Mr. CUTLER. Thank you, Mr. Chairman.

Senator MAGNUSON. Please put in the record the analysis of that. That's a new approach to me. I didn't know that.

Mr. CUTLER. Yes, sir.

Senator MAGNUSON. Have you got that in your statement?

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Mr. CUTLER. Yes, we do.

Senator MAGNUSON. All right, it will be in the statement, then.

[The statement follows:]

STATEMENT OF M. RUPERT CUTLER, ASSISTANT SECRETARY OF AGRICULTURE FOR CONSERVATION, RESEARCH, AND EDUCATION, DEPARTMENT OF AGRICULTURE

Mr. Chairman and members of the committee: The Department of Agriculture is pleased to have the opportunity to discuss H.R. 9370, S. 2582, and S. 2762, the proposed legislation which would promote aquacultural development in the United States.

The Department believes that authority currently exists within USDA to accomplish the primary purposes of these bills. The Department has historically provided services to fish farmers as well as those involved with other farming enterprises. The Department's interest in aquaculture was further supported by the enactment of the Food and Agriculture Act of 1977 (Public Law 95–113) which authorized the Department to have a lead role in supporting food and agricultural sciences; including aquaculture.

The Department of Agriculture believes that the production of fish and other aquatic species under controlled conditions in farm-owned or -operated ponds and other fresh water areas to be an agricultural enterprise. This enterprise is directly comparable in scope, effect, and result to other time-honored agricultural enterprises such as the raising of poultry, livestock, or crops. The Department of Agriculture has the staff, experience, and organization to carry out the necessary aquaculture support services and linkages at State and county levels, and has been instrumental in helping freshwater fish farming reach its current success.

Advice and technical assistance are being provided to individuals in connection with land and water resource appraisals, basic biological principles, and the design and layout of fish farming facilities. Educational services are provided in all aspects of aquacultural production. The Department, through a memorandum of agreement between the Science and Education Administration-Extension and the Department of Commerce's Office of Sea Grant, cooperates in providing field advisory services on marine aquaculture. Support is being provided to colleges and universities for research on many aspects of aquaculture. Research on nutritional value, safety, and marketing of aquacultural products and on the economics of various facets of the industry is being conducted. Vaccines for controlling aquacultural diseases are provided by private industry but under Departmental licensing and supervision. Assistance is provided in disease diagnosis. Loans may be provided to establish aquaculture enterprises and to offset losses occurring due to natural disasters. A more detailed explanation of specific Departmental activities in this area is included as an attachment.

Title XIV, the "National Agricultural Research, Extension and Teaching Policy Act of 1977," of the "Food and Agricultural Act of 1977" (Public Law 95–113) authorized the Department of Agriculture to expand its aquaculture support programs. Title XIV states, "The Department of Agriculture is designated as the lead agency of the Federal Government for agricultural research * * *, extension, and teaching in the food and agricultural sciences * * * sciences related to food and agriculture in the broadest sense, including the social, economic, and political considerations of * * * aquaculture" (Sec. 1404 and 1405). Title XV of Public Law 95–113 also includes aquaculture, in addition to agriculture, rural development, and human nutrition, as a basic function of the Department (Sec. 1502(a)). Title XV of Public Law 95–113 includes loan authority for aquacultural purposes as a function of the Department by amending Title III of the Bankhead-Jones Farm Tenant Act and subtitle A of the Consolidated Farm and Rural Development Act (Sec. 1503).

Since 1976, USDA has increased its emphasis on aquaculture to give it a higher profile within the Department. A USDA interagency work group was established in January 1976 composed of personnel from 11 USDA agencies. The work group has been active since its inception to make the Department responsive to and involved with the aquaculture industry. USDA personnel have actively participated in an interdepartmental committee on aquaculture to coordinate aquacultural efforts at the Federal and non-Federal levels, to avoid

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duplication with other agencies, and to assure optimum Federal involvement to the aquaculture industry. A USDA Aquaculture Coordinator was hired in February 1978 to provide leadership, coordinate aquaculture activities, and develop plans and procedures which would enable the Department to give appropriate consideration to the needs of aquaculture.

In view of the Department's historical support of aquaculture, the new USDA authority for aquaculture under Public Law 95–113, and the increased recent activity of USDA to promote aquaculture development, the Department opposes legislation contained in H.R. 9370, S. 2582, and S. 2762.

Mr. Chairman, we welcome any questions you may have.

The following is the detailed explanation of the U.S. Department of Agriculture's role in aquaculture.

SOIL CONSERVATION SERVICE (SCS)

With field offices in nearly all counties in the United States, the Soil Conservation Service is able to work directly with land owners and operators whose desires and farm resources indicate a satisfactory opportunity for some aspect of aquaculture.

The Soil Conservation Service assists the would-be aquaculturist to assess the potential of his resources for growing and marketing his product and to match his resources with the right kind of enterprise. Assistance is primarly with freshwater fish farming.

Assessment of resources includes: (1) water quality (field testing), (2) water quantity, (3) soils information, (4) market potential (general), (5) human resources, and (6) financial resources.

The small percentage of survivors of this initial resource appraisal (estimated to be less than five percent) then are given detailed assistance in developing a resource conservation plan considering: (1) water quality (monitoring and laboratory), (2) water quantity (monitoring and measuring), (3) cost-return analysis (break-even point), (4) fish habitat management, (5) specific soils information, (6) site limitations (physical), and (7) design and layout. Where FmHA financing is involved, the Soil Conservation Service may be requested to inspect construction as it proceeds.

Soil Conservation Service technicians usually do not aid in day-to-day management of the operating facilities. They do occasionally assess specific problems that may develop such as oxygen deficiencies and bank erosion and provide fish farmers new research results and results of experience gained by others. The diagnosis and treatment of diseases are referred to other agencies or private consultants for assistance with those problems.

In addition, the Resources Conservation and Development (RC&D) Program provides opportunities for local units of government and nonprofit organizations to participate in aquaculture. Three avenues are available. The first is through authorities relating to public water-based fish and wildlife development which could provide for participation on some aspect of aquaculture. The second avenue is the conducting of studies focusing on such aquaculture items as inventorying and evaluating opportunities and marketing surveys. The third avenue is through utilizing RC&D loan authorities which include "the conservation, development, and utilization of water for aquacultural purposes" (Public Law 95–113).

In fiscal year 1977, the Soil Conservation Service provided technical assistance with fish management on 37,923 ponds and 4,442 acres of commercial fish ponds.

SCIENCE AND EDUCATION ADMINISTRATION-EXTENSION (SEA–E)

The Science and Education Administration-Extension (SEA–E), as the educational arm of the Department of Agriculture, is charged under the Smith-Lever Act "to aid in the diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same." The Act further provides that "this work shall be carried out in such manners as may be mutually agreed upon by the Secretary of Agriculture and the State agricutural college or colleges receiving the benefit of this Act."

Thus, using research information provided by the State Experiment Stations and other research agencies, SEA–E has been actively engaged in fish pond

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management in 26 States; and added programs on marine resource education, the commercial fish industry, and the Sea Grant Program. In the freshwater area, activities include: fish bait production (17 States), catfish farming (15 States), and trout farming (5 States). A demonstration project was initiated in 1976 by the Texas SEA–E to evaluate catfish production as a supplemental source of food and income for small and low income farmers.

Activities have been expanded in the marine areas since SEA–E negotiated a memorandum of understanding with the Sea Grant Program. In 20 States, SEA–E is carrying out education programs under mutual agreement.

Recently, SEA–E personnel have been conducting educational programs on economics and management of aquatic animal harvesting, processing, storage, and marketing.

SCIENCE AND EDUCATION ADMINISTRATION-COOPERATIVE RESEARCH (SEA–CR)

The Science and Education Administration-Cooperative Research (SEA–CR) supports financial research on freshwater aquaculture at the State Agricultural Experiment Stations of Land-Grant Colleges. This involves 48 research projects having a total scientific manpower input of about 20 scientist-years. The combined total effort of all aquaculture projects at these State institutions was about 50 scientist-years in 1975.

Research is being conducted on several major aspects of freshwater aquaculture, including the breeding of aquaculture species for more efficient growth and more uniformity of product at harvesting; nutritional studies to define requirements for more efficient production of the various species; cultural methods for optimum production, such as water temperature and quality, stocking rates, harvesting methodology, raceway culture, and other practices for optimum production. Methods of disease and parasite control to reduce losses are being studied. Processing and marketing studies are in progress to improve product quality and nutritional value, product acceptability, and greater efficiency in processing and marketing aquaculture products.

The SEA–CR funds also support a Regional Research Project (S–83) entitled, "Freshwater Food Animals." Through this project, scientists can exchange unpublished research information, jointly plan future research activities, and avoid duplication of research. Nine State institutions and several Federal agencies (TVA, USDI, USDC, and USDA) participate in the project.

SCIENCE AND EDUCATION ADMINISTRATION-FEDERAL RESEARCH (SEA–FR)

The Science and Education Administration-Federal Research (SEA–FR) is not currently conducting research directly related to aquaculture. While the agency does have authority to conduct research in this area because of its responsibility for food production, current policy directs our research to terrestrial food production or agriculture due to resource limitations.

The SEA–FR does conduct research indirectly related to aquaculture. Such areas include the prevention of water quality degradation by pesticides, animal waste, and sedimentation from agricultural operations. The thrust, however, is not directed to aquacultural production.

This agency does have the capability for research in the aquaculture field due to its expertise developed in answering many of the needs of agriculture. These areas would include hydrology (the management of run-off from watersheds) including development of ponds and hydraulics of structures such as dams, raceways, and channels including aeration of water.

In the area of aquacultural production, we could contribute to solving problems such as viral, bacterial, and fungal diseases, parasitology, and nutrition. Our marketing research expertise could also easily contribute to similar problem areas in aquaculture such as in the development of new methods and processes for preserving aquatic foods to maintain flavor.

Besides food processing, we have considerable experience in the transportation, storage, wholesaling, and retailing of products to reduce costs, to maintain quality, and reduce losses from waste spoilage. Additionally, we are concerned with problems associated with human health and safety to ensure that food and food products are free from toxic, potentially dangerous residues, harmful chemicals, micro-organisms and from naturally occurring toxins.

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In summary—while SEA-FR is not researching the aquacultural field directly, it does have the capability for contributing to an aquacultural research program.

FARMERS HOME ADMINISTRATION (FMHA)

The Farmers Home Administration (FmHA) of the U.S. Dpartment of Agriculture channels credit to farmers, rural residents, and communities. It helps borrowers gain maximum benefit from loans through counseling and technical assistance.

Farmers and rural people have several credit programs they can call upon through FmHA to help purchase or operate farms, provide new employment and business opportunities, enhance environment, acquire homes, and upgrade the standard of living for all who wish to live in small towns or open country. Agency personnel are active on State and county committees involved with the improvement or development of local areas. They have learned the need for local ideas and initiative for leadership from private individuals and local officials.

Some loan programs are strictly for individuals and their families. Some involve associations of people. Other loans are made to partnerships, corporations, or public bodies. FmHA employees work in concert with all types of borrowers as well as with State and local officials, planning groups, and Government agencies.

The agency's loan authorities provide a supplemental source of credit, augmenting the efforts of the private lenders rather than competing with them. Most FmHA programs require that a borrower "graduate" to commercial credit when able to do so. The nature of the agency's operation makes it possible for FmHA to increase the supply of rural credit by drawing money from the major finance center.

Major purpose of FmHA's rural credit programs include:

1. To help build the family farm system, the economic and social base of many rural communities.
2. To expand business and industry, increase income and employment, and control or abate pollution.
3. To install water and waste disposal systems and other community facilities that will help rural areas upgrade the quality of living and promote economic development and growth.
4. To provide or improve modest homes in suitable rural environments at prices and on terms that families of low or moderate income can afford.

Most of the loan programs fall into two categories:

Guaranteed loans, in which the loan is made and serviced by a private lender. FmHA guarantees to limit any loss to a specified percentage. Interest rates are determined between borrower and lender unless the rate is established by law.

Insured loans, that are originated, made, and serviced by the personnel of the agency. Notes are sold to investors, backed by the full faith of the Government, and the investor's money replenishes a revolving loan fund. For most programs, interest rates to borrowers are determined by the current cost of Federal borrowing, although some rates are established by statute.

Farmer loans: Borrower must be family-sized operator, living on and operating his farm, at least on a part-time basis. Among the purposes for which farmer ownership, soil and water, and operating loans may be made are hydroponic farming and the production of fish under controlled conditions for human consumption.

Emergency loans: Emergency loans are only made in counties where property damage or severe production losses have occurred as a result of a natural disaster and the area has been named as eligible for assistance.

Emergency loans are made to eligible farmers, ranchers, and aquaculture operators for losses, major adjustments, operating expenses, and other essential needs arising from natural disasters so that they may continue their operations and return to local sources of credit as soon as possible.

Aquaculture.—This term as defined by Public Law 94-68 means the husbandry of aquatic organisms under a controlled or selected environment.

Aquatic organism planters—perform or actively manage the aquatic operations. Such operations must be conducted on the applicant's owned, leased, or permit grounds. Such grounds are grounds under water on which the planting

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operations are conducted. Other types of operations, such as contract operations, gathering such organisms, and harvesting those planted in public water, are not eligible for emergency loans unless these waters are identified and a permit is issued to the applicant. An applicant who performs the aquatic functions in connection with such operations owned by others (share operators), or is employed by others in any type of aquatic operation is not eligible.

Among the purposes for which emergency loans may be made are:

1. Production of water plants.
2. Operation of aquaculture farms or hydroponic farms.
3. Production of aquatic organisms under a controlled or selected environment.
4. Production of fish under controlled conditions for human consumption.
5. Production of oysters under controlled conditions.

Business and industrial loans: Loans to promote development of business and industry, including aquaculture may be made for projects in cities and towns below 50,000 population, but not in larger cities or in areas adjacent to them where population density is more than 100 persons per square mile. Preference is given to applications for projects in open country, rural communities, and towns of 25,000 and smaller.

ANIMAL AND PLANT HEALTH INSPECTION SERVICE (APHIS)

The Animal and Plant Health Inspection Service (APHIS) consists of Veterinary Service and Plant Protection and Quarantine. Veterinary Services activities in aquaculture are as follows:

1. Provide differential diagnoses of infections and toxicological conditions of fish through our facilities at the Veterinary Services Laboratories, National Animal Disease Center, USDA, Ames, Iowa.
2. Provide consultation of field veterinary epidemiologists, on a request basis, to local officials, and individual fish producers in the areas of infections and toxicological conditions.
3. Administration of the Virus-Serum-Toxin Act of 1973 which pertains to biological products developed for fish. Currently Enteric Redmouth Bacterin and Vibrio Anguillarum Bacterin are licensed.

ECONOMIC, STATISTICS, AND COOPERATIVE SERVICE (ESCS)

The Economic, Statistics, and Cooperative Service (ESCS) responds to requests for information relating to the economics of aquaculture. The most active involvement of ESCS has been in conjunction with the Resource Conservation and Development (RC&D) Program of the U.S. Department of Agriculture. Under that program, ESCS performs economic studies on typical problems encountered in the 1978 RC&D project areas in the United States. In addition, the National Economic Analysis Division of ESCS has conducted and maintains an interest in marketing studies relating to aquaculture as an element of the U.S. consumer's food purchasing patterns. Although the last published ESCS study relating to the economics of aquaculture was released in May 1973, ESCS maintains an active interest and regularly responds to requests for information on the economics of aquaculture. ESCS is not currently, however, conducting research in the economics of aquaculture.

[The following information was subsequently received for the record:]

QUESTIONS OF SENATOR LONG AND DR. CUTLER'S ANSWERS THERETO

Question 1. Why should the USDA have lead agency authority for Aquaculture?

Answer 1. This is an important question because lead agency responsibility is a major issue in the pending legislation. The answer goes beyond the issue of lead agency responsibility and reflects the indispensable and exclusive support provided by USDA to the existing aquaculture industry.

By law, USDA is the lead agency for aquaculture. The "Food and Agriculture Act of 1977" (Public Law 95–113) designated USDA as the lead agency for aquaculture and includes aquaculture as a basic function of the Department.

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The delivery system that the Department of Agriculture has in place and operating at all levels of the aquacultural industry is unique in this country and anywhere else in the world. To duplicate this system in another Department would require the deployment of large numbers of people, development of many millions of dollars worth of facilities, and establishment of almost innumerable linkages at State and county levels with government institutions and business officials as well as individual producers. USDA is the only agency organized and programmed for support of the culture of food and other agency cultural products and has over 100 years of applied experience in that effort.

Until now the only biologically and technologically feasible and economically viable aquacultures developed for application in the U.S. are for freshwater species where USDA has been traditionally involved.

Question 2. What has the USDA done to exercise lead agency authority since enactment of the Food and Agriculture Act of 1977?

Answer 2. As a first step to expand our involvement in aquaculture, we hired our first Aquaculture Coordinator in February, 1978, to provide leadership, coordination, and expertise in planning and implementing aquaculture programs within the Department and to coordinate USDA aquaculture initiatives with other government agencies as well as the aquaculture industry. Through an interagency Aquaculture Work Group, we are currently developing a greatly expanded aquaculture plan. We are also negotiating with the National Academy of Sciences (NAS) to assist in designing some components of the plan in order to take advantage of their study "Aquaculture in the United States—Constraints and Opportunities."

The Department submitted a request to OMB for an additional $3.62 million for aquaculture in fiscal year 1979, over and above the $2.5 million contained in the President's 1979 budget for work in aquaculture.

In a memorandum dated April 12, 1978, Secretary Bergland directed me as Assistant Secretary for Conservation, Research and Education to be responsible for coordinating and leading the Department's activities in supporting aquaculture. The wording of that memorandum reflects the Department's concern and intentions for aquaculture:

"Aquaculture is rapidly becoming a significant component of the Department of Agriculture programs in food production, land and water conservation, rural development, and other agricultural programs of major responsibility of the Department. I am concerned that the Department does whatever is necessary and proper, in respect to balance with other established programs, to fully support commercial, recreational, and home-use aquaculture in the U.S. for: the benefit of farmers, small businessmen, and the pubic in general; the conservation and use of the land and water resources; the economy of the Nation."

Question 3. Response to statements of witnesses that the future of aquaculture is in salt water and brackish water species.

Answer 3. The facts do not support this statement. There is potential for aquaculture development in salt and brackish water environments. However, all indicators suggest that the greatest future for aquaculture is in the freshwater species and environments rather than in salt and brackish waters. For example:

1. Only a very small portion of U.S. coastal areas and estuaries is suitable for aquacultures for which technology is developed or relatively well developed. On the other hand, approximately 50,000 acres of freshwater ponds are in commercial aquacultural production and hundreds of thousands of additional inland acres could be brought into production.

2. Suitable salt and brackish water areas are mostly public property with very restricted use. The alternative uses of suitable areas tend to have higher social and economic benefits than aquaculture. Some major alternatives include: (*a*) National habitat preserves as natural nursery and feeding grounds of wild birds and mammals as well as aquatic animals, including species of major economic importance such as shrimp, (*b*) Real estate development, and (*c*) Recreational uses.

In contrast, inland areas suitable for freshwater aquacultures are not subject to competition from the variety of nonagricultural uses that limit development of salt water and brackish water aquacultures.

Social, political, legal and environmental constraints are now, and are likely to be in the future, major inhibiting factors to use of salt and brackish water environments for aquaculture.

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3. Biologically feasible and economically viable technology has not been developed to an applicable level for nonfreshwater acquaculture of animal or plant species in the United States. Yet, in freshwater, catfish yields can be increased three-fold per acre per annum now with existing technology.

Marine and estuarine environments, because of tides, great depths, pressure of predator and competitor species, and many other factors, make controlled culture much more costly and inefficient than culture in ponds and raceways.

Question 4. Response to Rep. Forsythe's testimony that of the six high priority species currently identified for aquaculture development, none are in the jurisdiction of the USDA.

Answer 4. This statement is in error. Apparently the statement was taken out of context from the "NOAA Aquaculture Plan" which reads, "Finally, certain species appear in the medium-priority list because of their relevance to NOAA responsibilities and policies. For example, freshwater species such as trout, catfish, crawfish, and several species of baitfish are reared commercially, but primary responsibility at the Federal level for these species is lodged within other agencies." In other words, NOAA was only reflecting their interests in their plan.

Catfish and trout would have to lead the high priority species list in a national aquaculture plan, because catfish, trout, and crawfish—all freshwater species—are the only viable aquacultures for food production in the United States.

Of the six high-priority species of salmon, marine shrimp, freshwater prawns, oysters, marine plants, and lobsters listed in the NOAA Plan and cited by Rep. Forsythe, all except oysters and plants are at the top of the food chain and will probably never be cultured for consumption by the average consumer. These products will be luxury products of wealthly producers for wealthy consumers.

Aquaculture technologies of marine and brackish water species elsewhere in other Nations of the world are not directly applicable in the United States. This includes those of Japan which is often cited as the Nation on which the U.S. could model its marine and brackish water aquacultures. Japan has received high and just praise for their advanced state of aquaculture of yellowtail (marine), both food and pearl oysters, marine shrimp, and ayu and eels (anadromous). However, essentially none of the technologies for culturing these species is applicable in the United States because of the very high production costs associated with each. Except for oysters, cultures of each of these species require high levels of animal protein for production. For example, 10 pounds of "trash fish" are required to produce 1 pound of yellowtail. Ayu, eels, and shrimp have similar feed requirements.

Senator MAGNUSON. All right, Mr. Greenwalt of Fish and Wildlife.

STATEMENT OF LYNN A. GREENWALT, DIRECTOR, U.S. FISH AND WILDLIFE SERVICE, U.S. DEPARTMENT OF THE INTERIOR

Mr. GREENWALT. Thank you, sir.

I am Lynn Greenwalt, Director of the U.S. Fish and Wildlife Service, Mr. Chairman, which is part of the Department of the Interior. I shall paraphrase my statement, if I might, Mr. Chairman, in the interest of time. The Department of the Interior, along with the rest of the administration, has taken a position previously embodied in the testimony both of the Department of Commerce and of the Department of Agriculture.

I would like to say, Mr. Chairman, something about the Fish and Wildlife Service's activities in the past and present related to aquaculture. I think you're familiar, in light of your chairmanship of this committee, with the kinds of things that the Fish and Wildlife Service has done over the years in the area of research and development and other activities which provide information very useful to aquaculture programs of any kind.

I'm sure you are familiar with the work done at our Cortland, N.Y., nutrition laboratory, where there has been a variety of developments over the years in the area of nutrition which has resulted,

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among other things, in the development of dry fish food, which has revolutionized the practice of aquaculture worldwide. As an example of one of the things that's been done at Cortland, Dr. Gary Rumsey, the head of that institution, is now using a computer to develop diets for a number of species of fish, a technique that has great potential for aquaculture and for fish culture in general. We've also developed a fishfood regime that has been proven sufficient to carry such fish as the Atlantic salmon through their entire life cycle. We can now raise these fish from eggs through adulthood in one place, which is, of course, a major technological advance in the field of aquaculture.

We also have two fish farming experimental stations, one at Stuttgart in Arkansas and the other in Marion, Ala. They have as their primary mission the development of all phases of aquaculture.

The vast majority of the research necessary to obtain Food and Drug Administration approval of chemical compounds used in aquaculture and fish culture generally is performed at the Service's fish control laboratory in La Crosse, Wis. We are also building and will shortly complete a facility for the investigation and propagation of cool-water species such as walleye, perch, and pike. This will be in Wellsboro, Pa., and should be operational next spring. This laboratory will be a broad-spectrum one which will investigate a full range of activities related to the culture of cool-water fish, each dimension of which has some application to commercial aquaculture.

We also have five development centers which coordinate the findings of the research laboratories and the production techniques of the hatchery system and by that means develop improved techniques and approaches which can be applied to aquaculture generally. We are currently working on such areas of fundamental importance as environmental controls, pollution abatement, diet formulation, quality control, production methods, and the development of equipment, as well as carrying out training and short courses for fish culture specialists.

As you can see, Mr. Chairman, we practice aquaculture daily on a nationwide basis, to enhance both sport fishing and commercial aquaculture.

Senator MAGNUSON. This is all on freshwater fish?

Mr. GREENWALT. Generally, yes, sir.

Senator MAGNUSON. I think the program has been very good. I've always recommended money for it in the Appropriations Committee. But 95 percent of it deals with freshwater fish.

Mr. GREENWALT. That's correct, sir.

Senator MAGNUSON. Which are inland.

Mr. GREENWALT. Many fish which are cultured now and will be more so in the future are those which are anadromous. They spawn or initiate their life in freshwater and then go to sea. I think an important aspect that is frequently overlooked is that the salmon of the world all begin and spend an important part of their lives in freshwater.

Senaor MAGNUSON. The habits of the salmon cut across all of these.

Mr. GREENWALT. That's correct.

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Senator MAGNUSON. And that's the main one, when you get right down to it—salmon. If you eliminated salmon, namely, you would be primarily, 95 percent, in freshwater fish.

Mr. GREENWALT. That's quite true, sir.

I think the important thing, Mr. Chairman, is that the Fish and Wildlife Service possesses a body of skills and understanding, that relates particularly to freshwater fish, but with a scientific background applicable as well to marine fisheries. The Fish and Wildlife Service stands ready to offer its skills and its background information to any aquaculture program that may be developed.

Senator MAGNUSON. And there's a great deal, if you go into the saltwater program, that we heard about this morning.

Mr. GREENWALT. Yes, sir.

Senator MAGNUSON. There's a lot of background that you people have developed that could be used there. There's no question about that.

Mr. GREENWALT. Very much the point, sir; yes.

Senator MAGNUSON. Then why are you worried about the Indians then?

Mr. GREENWALT. Fundamentally, sir, we're not so concerned about the Indian treaties as such——

Senator MAGNUSON. I mean with respect to this particular program. I'm worried about the Indian treaties every day of the week.

Mr. GREENWALT. Yes, sir; perhaps more so than any other person I know.

Senator MAGNUSON. But I don't think that any of these bills would affect treaty rights.

Mr. GREENWALT. The Bureau of Indian Affairs and the Indian peoples are particularly concerned that there be recognized that the resource base is finite and that there can be only so many fish produced in the ocean. The legislation should encompass an understanding that the treaty rights as interpreted by the courts give the Indians a guarantee to a part of that.

Senator MAGNUSON. I think that easily could be inserted in any bill.

Mr. GREENWALT. I agree. As you know, Mr. Chairman, the Indians, particularly in the Northwest, are developing some aquaculture programs, and one of their concerns is that other aquaculture programs should not compete with their programs for the resource base. I'm sure that could be put in any bill as well.

Senator MAGNUSON. In my State the Puget Sound Indians are doing it on Indian land.

Mr. GREENWALT. That's right, sir.

Senator MAGNUSON. All along Puget Sound they have the coastlands and they're using their own land. But they would take advantage of any kind of bill or any grant that you would make available.

Mr. GREENWALT. This is a point that I was asked to emphasize.

Senator MAGNUSON. We do it now. In Commerce we have two or three EDA grants for Indians which go through Commerce because it's a commercial matter.

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Mr. GREENWALT. Yes. The Indians are involved in sea ranching of salmon.

Senator MAGNUSON. Yes.

The possibility of industries in this field, which is cultured finfish, is very modest because of high production costs. That's true now, is it not?

Mr. GREENWALT. That's correct.

Senator MAGNUSON. It would seem to me that encouragement of more aquaculture, one of the purposes of this type of legislation, or even what you're doing, is to cut down the cost of production and make it easier to do, give us more efficient ways and things of that kind.

Mr. GREENWALT. I agree, sir. One of the things that we're doing is trying to reduce the cost of growing fish, regardless of who grows them, because it's costly to the Federal sector as well as to the private sector. Anything that can reduce the cost of growing fish is likely to increase the profit, which is obviously important to business.

Senator MAGNUSON. Your group, of course, is more concerned with inland hatcheries, aren't you?

Mr. GREENWALT. Yes, sir. However, we also contribute to the salmon industry.

Senator MAGNUSON. Generally, everyone agrees that there should be some coordination. It's scattered too much and costs too much to put them together.

Mr. GREENWALT. Absolutely.

Senator MAGNUSON. I think everybody agrees to that, really. The question of how much, now that's an argument between myself and OMB.

Mr. GREENWALT. I think that's a cogent observation, sir.

Senator MAGNUSON. OK, thank you very much.

Mr. GREENWALT. Thank you.

[The statement follows:]

STATEMENT OF LYNN A. GREENWALT, DIRECTOR, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR

I am Lynn A. Greenwalt, Director of the U.S. Fish and Wildlife Service, Department of the Interior. I appreciate the opportunity to appear before this Committee to discuss aquaculture. At the outset, I would like to state that, while the Department of the Interior agrees that a more coordinated approach to aquaculture is called for and endorses some of the concepts embodied in these bills, we recommend against enactment of this legislation. The Department of Commerce has stated the views of the Administration's opposition to these bills and we fully support this position. Like the Department of Commerce, we are especially concerned with the establishment of major aquaculture financing and insurance programs. We do not, moreover, believe that this legislation does not take into account the many State and private efforts in the field of aquaculture management.

As you know, the Administration is currently [illegible] Could affect the Future [illegible] studies in the area of [illegible] In addition, the Administration is now [illegible] Comprehensive Federal [illegible] Peculiar of these studies [illegible]

Mr. Chairman, with your permission, I would like to provide the Committee with some background on the Department of the Interior's role in aquaculture. History of activity in the field of aquaculture

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The Fish and Wildlife Service has the most extensive, the most intensive, and the best integrated finfish aquacultural system in existence in the United States. Our Division of Fish Hatcheries has evolved from two fish hatcheries in 1872 to 88 such facilities today which produce 268 million fish and fish eggs annually.

The Service's research activities include a nutrition laboratory in Cortland, New York, and a fish disease laboratory in Leetown, West Virginia. These laboratories, because of the excellence of the facilities and staffs, are among the most highly respected of their kind in the world. Research at the nutrition laboratory succeeded in not only defining the basic nutritional and mineral requirements for cultured fish, but was primarily responsible for the development of the dried fish food which revolutionized aquaculture both in the United States and abroad. This fish food has been proven to be sufficient to carry such fish as the Atlantic Salmon through their entire life cycle.

The research effort also encompasses two fish farming experimental stations in Stuttgart, Arkansas, and Marion, Alabama. These stations have as a prime mission the development of all phases of aquaculture. The station in Stuttgart, which is devoted mainly to research on catfish and bait minnows, also provides extension services for aquaculture.

The vast majority of the research necessary to obtain Food and Drug Administration approval of chemical compounds used in aquaculture is performed at the Service's Fish Control Laboratory in LaCrosse, Wisconsin. In addition, the Service is constructing another research laboratory to investigate the propagation of cool water species such as walleye, perch and pike. This facility, to be located in Wellsboro, Pennsylvania, should be operational next spring. We also operate the Western Fish Disease Laboratory in the State of Washington which, in addition to the work on diseases of salmon, also investigates the physiology of smoltification which will most certainly lead to greater returns of sea run salmon on the west coast to the benefit of both commercial and sport fishing interests.

The Service also has five development centers which coordinate the findings of the research laboratories and the production techniques of the hatchery system. These centers are presently working in the areas of environmental controls, pollution abatement, diet formulation, quality control, production methods and equipment and training workshops and short courses.

In cooperation with State universities and conservation agencies, the Service operates 25 Cooperative Fishery Units. Over 50 percent of these units conduct investigations concerning various aspects of aquaculture. These and other institutions have expertise and facilities which have already made many meaningful contributions to aquaculture. Findings produced through research and development programs are channeled into the extension services of the States, the Department of Agriculture and Sea Grant.

In fiscal year 1979, the Service will spend approximately $22 million on various aquaculture activities, $4.5 million of which is on aquaculture related research.

As you can see, we practice aquaculture daily on a nationwide basis to enhance both sport fishing and commercial aquaculture. Our technical research and development efforts on freshwater finfish have and will continue to benefit aquaculture regardless of the purpose for which the fish will be used. We intend to continue to vigorously practice the science and art of aquaculture under our present mandates.

In addition to the Fish and Wildlife Service, Indian tribes are governmental entities and retain jurisdiction over the natural resources of their reservations. Many tribes carry out their responsibilities in this regard through tribal or inter-tribal resource management agencies which have considerable technical competence. Examples of this may be found particularly in the Northwest, among the tribes of the Columbia River Inter-tribal Fish Commission and the Northwest Indian Fisheries Commission. Their activities include regulation of tribal fisheries and watershed management. They are also working with the States to establish uniform principles for fisheries management and research.

Before I close, I would like to share with the Committee the Department's views on how we could best support the private aquaculture industry, an essential element of a comprehensive aquaculture plan.

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Efficiency of the industry as it presently exists could undoubtedly be improved by sound research on nutrition, disease control and drug clearance, genetics and production systems. While considerable public attention recently has been focused on marine species, culture of fresh and brackish water species comprise the major portion of cultured species worldwide including the U.S. This pattern is likely to continue because the medium is more readily controlled.

The profitability in the industries which culture finfish is very modest because of high production costs. The single most costly production item is fish food. Food costs in aquaculture account for 25 to 80 percent of the total production costs depending upon the type and efficiency of the operation. Therefore, every slight reduction in the cost of food will be favorably reflected in the profit structure. Fish and Wildlife Service fish nutritionists tell me that, although we have developed satisfactory diets for some species of fish, the potential for improvement is great. Preliminary experimentation, for example, indicates that perhaps we tend to feed juvenile fish too little and larger fish too much. As we conduct more sophisticated nutrition experiments, we continue to learn that we have a great deal more to learn about the interactions of vitamins, minerals, nutrients and trace elements as well as their relationships to such extrinsic factors as temperature, water quality, water flow and fish density. We anticipate a long series of minor breakthroughs which in time will lead to better and less costly diets. Probably the same can be anticipated in other areas of fishery research.

The second most costly production problem is fish health. The Service became interested in this problem in the 1930's and, accordingly, established the laboratory at Leetown, West Virginia, which has pioneered in the identification of fish parasites and diseases as well as preventive measures and treatments. These problems are all too frequently the bane of the fish culturist's existence as well as his budget. Early and continuing research on viral and bacterial disease of salmonids has recently led to the development of vaccines which seem destined to revolutionize cage culture and sea ranching of the Pacific salmon and other species. The Leetown facility is now being renovated and expanded into a National Fisheries Center. When completed, the facility will be the most advanced fishery research, development and training center in the world. One of the primary functions of the National Fisheries Center will be to continue research on the diagnosis, treatment and control of fish diseases.

In summation, it would not be an exaggeration to state that, in the crucial fields of fish health and fish nutrition, the Department's research and training programs are the most advanced in the world. We have also made significant contributions to other areas of aquaculture and we are well prepared to participate in a coordinated Federal effort in this field.

We look forward to working with the Committee to develop a coordinated aquaculture program.

This concludes my prepared statement, Mr. Chairman. I would be pleased to answer any questions you might have. Thank you.

Senator MAGNUSON. The record will be kept open, if anyone wishes to add to their testimony. And we'll recess until Wednesday of this week, when we will continue these hearings.

Thank you all very much for coming.

[Whereupon, at 11:50 a.m., the hearing was recessed, to reconvene on Wednesday, April 19, 1978.]

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NATIONAL AQUACULTURE ORGANIC ACT OF 1978

WEDNESDAY, APRIL 19, 1978

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, D.C.

The committee met at 10:10 a.m. in room 235, Russell Senate Office Building, Hon. Warren G. Magnuson presiding.

Senator MAGNUSON. The committee will come to order.

On Monday, we had hearings on three aquaculture bills, a House-passed bill, H.R. 9370, and two Senate bills, S. 2582 and S. 2762. We heard from the governmental agencies on Monday, and today we will hear from so-called outside witnesses.

Our first witness is Mr. Porter Briggs.

Mr. Briggs is the president of the Catfish Farmers of America, from Little Rock, Ark. We will be glad to hear from you.

STATEMENT OF PORTER BRIGGS, EXECUTIVE SECRETARY, CATFISH FARMERS OF AMERICA AND U.S. TROUT FARMERS ASSOCIATION

Mr. BRIGGS. Thank you, sir.

For the record, I am executive secretary of Catfish Farmers. I am here today to speak on behalf of the Catfish Farmers of America, and the U.S. Trout Farmers Association. I have submitted written testimony, and if it is all right, I will speak briefly and extemporaneously from notes.

The U.S. Trout Farmers Association was founded in 1952; has members in 45 States; its members pay dues from $50 to $500 per year; and publishes a magazine "The Salmonid," circulated in the United States and foreign countries. Catfish Farmers represents 80 percent of the industry; has been in existence since 1968; and its members pay dues of $30 to $600 per year.

I would like to briefly give a history of our position on this testimony. In the last few weeks our position has become somewhat controversial because we have received several letters from Members of Congress asking us why we have changed our position.

Senator MAGNUSON. Did you appear before the House?

Mr. BRIGGS. Yes, sir, I did.

Senator MAGNUSON. You did. So they have heard your testimony.

Mr. BRIGGS. But it is different now. We have a different position now.

Senator MAGNUSON. Why is it different now?

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Mr. BRIGGS. Because the last time we testified was before Public Law 95–113, the agriculture bill was passed into law last September. The last time we testified we still did not have any——

Senator MAGNUSON. Did you appear against the bill in the House?

Mr. BRIGGS. No, sir. We appeared and gave the bill qualified support.

Senator MAGNUSON. Go ahead.

Mr. BRIGGS. And had done so for several years since the aquaculture hearings first began in May of 1975.

Last summer, when S. 275, Senator Talmadge's bill that later became Public Law 95–113, was introduced it included, for the first time, a congressional initiative to put aquaculture into congressional language assigning increased authority to an agency of the Government, in this case, the Department of Agriculture. When that happened, we came out in support of S. 275.

Then the bill was passed in September. Our board did not meet to change its position until January. When we did meet, we changed our position, saying the lead agency issue was very important to us, and we felt it should be the Department of Agriculture, where in the past we supported the bill saying it should be the Department of Commerce.

The reason we supported the bill was because we had been to see Secretary Butz before we first testified in May of 1975.

Senator MAGNUSON. But you are talking about fresh-water fish.

Mr. BRIGGS. Yes, sir.

Senator MAGNUSON. All right.

Mr. BRIGGS. Yes, sir.

Senator MAGNUSON. The Department of Agriculture has had a long-time program on that. I hope there is no conflict. We think the program is a good one and will continue.

Mr. BRIGGS. There was a conflict. Secretary Butz said he did not want it. That is the reason we supported the bill in the House.

Senator MAGNUSON. I understand that. We have that on every bill we have up here. Go ahead.

Mr. BRIGGS. Well, in any event, we have changed our position and we are now in a position where we think the most important issue in these aquaculture legislative proposals to the lead agency question. We think a lead agency should be designated.

Second, we feel it should be the USDA. I have been talking to some of the other persons in the aquaculture industry just prior to this testimony, and it is obvious from these discussions that there is disagreement on this issue.

I would initially like to encourage you and your staff to try to at the earliest possible date to convene a meeting of the leaders in the aquaculture industry to try to work out some kind of compromise so we can come up with a bill which all of us in the aquaculture industry can support.

The Catfish Farmers and Trout Farmers support Senator Stone's bill, and oppose H.R. 9370. And we oppose Mr. Gravel's and Mr. Weicker's bill. I feel there is a reasonable possibility that if you were to use your offices to call together a meeting of the varied interests in aquaculture which have presented disparate positions in

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these bills, that we might find a compromise. I would like to encourage you to do that. The lead agency question, some persons in the aquaculture industry feel is not a critical issue. We think it is critical. We think to not designate a lead agency would be to insure an uncoordinated program.

There are a number of reasons for having a lead agency, and they were outlined in the National Academy of Science aquaculture study. From our own experience we know, that the Departments of Commerce, Interior, and Agriculture all have key roles to play in the development of aquaculture, and we are not recommending any roles be lessened. In fact, we think additional funds are needed in all three of them for the various activities in aquaculture, but what we do think is when legislation is passed by Congress, we would hope it would be passed with the joint cooperation of this committee and the Senate Agriculture Committee, and, hopefully, have the unanimous support of the aquaculture industry, but right now it does not. We are in the position where the catfish and trout industry, which are active organizations politically, will use their influence to oppose this legislation, and we think it will create the possibility of passing no legislation which would not benefit any of us, because we do need aquaculture legislation.

Senator MAGNUSON. You do not oppose the basic thrust of the legislation, do you?

Mr. BRIGGS. I beg your pardon, sir?

Senator MAGNUSON. The basic thrust of the legislation.

Mr. BRIGGS. You say I do not oppose it?

Senator MAGNUSON. You are not opposed to it?

Mr. BRIGGS. I qualify it by saying, including——

Senator MAGNUSON. Wait a minute. I asked a simple question. The basic thrust is to try and coordinate our efforts in the field of aquaculture, and we should give it some support nationwide. It is now in three departments. Everyone knows there will be an agreement among those departments between who is going to be the lead department and who is not. I do not think anybody intended, including the House, to have a deterioration of what Agriculture is doing, what Interior is doing, or what NOAA is doing. This is what you agree with.

Mr. BRIGGS. Yes, sir. I agree with that, but I think the lead issue question is critically important. I think it should be the USDA. They are a food-producing agency.

Senator MAGNUSON. I do not disagree with you. We want to get everyone's views on where they think this thrust will do the most good. Which department? It seems to me what we are trying to do is call attention in the United States to the fact that we can do much more in this particular field.

Mr. BRIGGS. Yes, sir, but we do not need to spend the kind of money that H.R. 9370 is talking about.

Senator MAGNUSON. But you do not disagree with that bill, do you?

Mr. BRIGGS. No, sir, but I think the funding levels should be increased more arithmetically than they——

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Senator MAGNUSON. You are talking about procedure. I am talking about what we are trying to do. How we can best achieve that goal seems to be the argument, is that not correct?

Mr. BRIGGS. Yes, sir; that is correct. We do agree that legislation is appropriate for the development of aquaculture. Federal policy is needed, and it must also coordinate the activities but not lessen the roles of Commerce, Interior, or Agriculture, or those other agencies that have marginal involvement in the industry. Regarding the expenditures, however, we question the manageability of increasing from 4 to 15 to 17 million. But most of all, Senator, we think that to appropriate twice as much money to the Department of Commerce than to Interior and Agriculture, is without basis in fact. There is no reason for that.

The lead agency, whichever one it is, will need more funds because they will have more management responsibility, but not twice as much. I think you are talking about a few hundred thousand dollars for this added responsibility. The testimony before the House indicated it will cost $268 million over the next 5 years for this program. That is an outrageous funding level. Funding in the long-term programs is needed, but when you talk about funding the loan program, we should wait for the U.S. Department of Agriculture. We should give them 30 to 60 days to come up with some kind of initiative before a loan program is created in the Department of Commerce.

As far as the loan program is concerned, there is a serious question in our mind about the ability of the Department of Commerce to deliver the services proposed in this legislative package. How can the Department of Commerce, which has comparatively little, if any, outreach throughout the United States administer an aquaculture loan program without setting up a massive bureaucracy—massive maybe an overstatement, but without setting up an unnecessarily large and duplicative bureaucracy. The USDA has the program in place, the experience which is important. Why reinvent the wheel and let the Department of Commerce make these mistakes that they will undoubtedly make that we feel the USDA would not make. We do not want to see qualified people denied credit who want to build aquaculture facilities. Perhaps there is a role for the Department of Commerce to play in this, because they are the agency which has the expertise in salt water aquaculture. It may be this committee through legislative intent or colloquy can have the Department of Commerce administer part of this as pertains to salt water, but the way it is proposed in this bill, we think is conceptually poor, very poor. We would be interested to know how the Department of Commerce would administer this, if they were given the authority, realizing they are opposing the bill because the administration told them to do so.

Again, we think USDA should be given a comparatively short amount of time to see if they want this initiative before you pass legislation. We have been debating this bill for a number of years, and why not give the USDA just a couple of months to see if they are going to do this. Is there an emergency to pass this bill immediately? There is no emergency, but there is a sense of urgency.

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There is time to wait for the USDA to see what initiative they will take and there is time for your staffs to go to the Department of Agriculture, or to try to convene a meeting to see if we cannot develop a sense of unanimity.

Another question is who should do what in the Government. We are of the mind that the Department of Commerce is doing an excellent job. They played a key role in the development of the catfish industry and the salmon industry, two examples I am intimately familiar with. The USDA has an extensive role to continue to play and we should capitalize further on their extensive resources. The Department of the Interior is the lead agency in terms of certain fisheries and should be involved.

We think this legislation should call attention to the opportunities for development of aquaculture on the level popularly referred to as appropriate technology, following the example of the late E. F. Shoemaker. This is not thrown out lightly by our industries. There are literally millions of people who are maintaining live fish in their homes and we think there is a possibility in the future—not right now, the technology is not on the immediate horizon but in the future—that like victory gardens to grow vegetables and fruit, it will be possible to grow fish in and around homes, both in urban and rural areas.

We think it would be appropriate in the language of the bill to specify at least some small part, at least 1 or 2 percent of the effort of these agencies should be aimed toward the development of appropriate technology, beside aquaculture.

Aquaculture right now is, as it should be, an industry oriented towards food production for the marketplace. Appropriate technology language in your legislation could help insure that aquaculture in part will be developed for people producing food for their own consumption at the family economic unit level.

As far as the Gravel bill, we think it would create too large a bureaucracy for the needs of this industry at this time. The Weicker bill ignores the question of a coordinated program because it deals only with the Department of Commerce.

One specific small comment I will make, America is not a Nation of fish eaters and to compare our aquaculture development with that of Japan and Iceland and other countries that are fish eaters is inappropriate. We think this nation is one of meat eaters, and the incentive should be appropriately provided by this legislation to increase the per capita consumption of fish. To make these comparisons with Japan and Iceland and other high fish-consuming countries is inappropriate, and we do not think has relevance to the development of aquaculture legislation.

In closing, Senator, I would like to encourage you to use your offices to try to bring these people together in the industry, because I think the grounds for compromise may exist in this aquaculture industry.

Thank you.

Senator MAGNUSON. In your statement you said the lead agency must be designated by Congress and after the agency is designated. Congress must give them time to propose and implement a

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You also stated that "we feel the details on how to implement the program and the levels of authorization could best come from the executive branch of Government."

That would be after some compromise bill was passed?

Mr. BRIGGS. Yes, sir.

Senator MAGNUSON. You have given us some good advice.

You complimented the program which has been done by the National Marine Fisheries Service under the sea-grant program. The Senator from Alaska and I also think they have done an excellent job. But the problem has been that the sea-grant programs receive so little money compared to land-grant programs and we have had to squabble and struggle just to keep them alive. We would like to change that. But we think it has been a good investment. When you say that Congress should take the lead in establishing a lead agency, you believe the lead agency should be the Department of Agriculture, is that right?

Mr. BRIGGS. Yes, sir. It is a food-producing agency. The National Fisheries Service has done a good job in the fresh-water area and we do not want to lose their expertise.

Senator MAGNUSON. Again let me say that the thrust of the bill. the objectives, the goal, is that we should do more in the field of aquaculture, whether it be in the area of fish, shellfish or in other areas in which we have an interest.

Mr. BRIGGS. Yes, sir. Unequivocally.

Senator STEVENS. Mr. Chairman, I am not totally in disagreement with the statement that we should have a lead agency. My problem is that we have had to drag the Department of Agriculture into this area kicking and screaming. We have argued for years that the fishermen are farmers of the sea, and each time they come up with a bill, we have had to remind them that the fishermen should be included in some of the agricultural programs. If I had any indication the USDA was ready to move in the marine area, that would be a different matter, but I haven't seen any indication that they are willing to move out and establish a substantial production from the aquaculture concept in marine fisheries. That is the problem.

You say a lead agency—we could designate Agriculture right now, and we would have the same thing as we had in the past, nothing, in the area of marine fisheries.

Mr. BRIGGS. The USDA, as I understand it, does not consider catching fish in the ocean as an agricultural activity because they generally have to do with planting and harvesting.

Senator MAGNUSON. That is the point.

Mr. BRIGGS. We are talking about aquaculture, where you actually spawn and feed and spawn these species. To say the USDA is not interested in aquaculture because they have not helped commercial fishermen in the marine areas I think it is a non sequitur. I do not think the USDA wants to take over the National Marine Services activity. We are talking about the lead agency here. I said in my testimony we do not want to take anything away from the National Fisheries service. We want to enhance it and see that their activities are appropriately funded.

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Senator MAGNUSON. The USDA has hundreds of millions of dollars for all kinds of research, but they have devoted very little of it to aquaculture over the years. What the Senator from Alaska says is correct. What we are concerned with, of course, is the development of salt-water shellfish and things of that kind, particularly the salmon industry and the marketing of a lot of fish we do not use, particularly since we passed the 200-mile limit.

So that becomes a problem. No one has suggested that the program the USDA has administered has not been done very well.

Mr. BRIGGS. The USDA did support Public Law 95-113 legislation and they have also taken increased interest in this area in the past. Mr. Butz was opposed to any involvement in aquaculture because he did not want to fight this jurisdictional battle which perhaps will come to the surface. They are involved now. Their Assistant Secretary came to a meeting in January and so indicated.

Senator MAGNUSON. Well, we have an open mind, but our bottom line is that we should be doing more about aquaculture, in every area, salt, fresh, and everything.

Mr. BRIGGS. You mean the Government.

Senator MAGNUSON. We run into these arguments between agencies downtown every day, not only on this particular bill, but with every one. Everybody wants their own turf. What we want to try and do is to become more efficient in the field of aquaculture. We are importing and have a balance-of-trade deficit of about $2 billion on fish. $2 billion which we could cut in half if we did more about enhancing the value and the work and the marketing of our own fish. This deals with the salt-water area. Which is one of the problem areas. But we appreciate your testimony. We have an open mind about it.

Mr. BRIGGS. Senator, the only thing I would like to add, we hope whatever you do, you will do it together with the Senate Committee on Agriculture, so that there will not be a jurisdictional problem there, if that is possible.

Senator MAGNUSON. We will probably have to do what you suggested, sooner or later.

Mr. BRIGGS. Thank you.

Senator MAGNUSON. Thank you very much.

[The statement follows:]

STATEMENT OF PORTER BRIGGS, EXECUTIVE SECRETARY, ON BEHALF OF CATFISH FARMERS OF AMERICA AND UNITED STATES TROUT FARMERS ASSOCIATION

My name is Porter Briggs and I am Executive Secretary of Catfish Farmers of America (CFA). I would like to thank the Committee for this opportunity to present the views of our organization and of the United States Trout Farmers Association (USTFA) on the referral of H.R. 9370 and S. 2582.

Catfish Farmers of America is a national association with members located in over 30 states. The members of our organization frequently produce other species of fish as well as catfish. Our interest principally is freshwater fish culture. Our Association represents approximately 80 percent of the commercial catfish production in the United States and our members pay dues ranging from $30 to $625 a year. We have been in existence since 1968.

The United States Trout Farmers Association is a national association with members located in over 40 states. The principal interest of the USTFA is also freshwater fish culture. The United States Trout Farmers Association represents approximately 85 percent of the commercial trout production in

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the United States and its membership pays dues ranging from $50 to $500 a year. It has been in existence since 1952. The USTFA publishes a bimonthly called *Salmonid* which is the official journal of the organization with readers in all 50 states and several foreign countries.

In addition to serving as Executive Secretary of CFA, I am also publisher of the *Commercial Fish Farmer* which is the largest aquaculture magazine in the world with readers in 80 countries and all 50 states.

We would like to take this opportunity to thank the Senators and their staffs for their interest in this legislation. We think that aquaculture has now proven its potential to become an important new source of protein in the future of our nation and the world. It seems appropriate to give a brief history of our position on these and other proposals for aquaculture legislation on which testimony has been given since May of 1975. Long before the first testimony was held on any aquaculture bill, Catfish Farmers of America sought unsuccessfully an appointment with the Secretary of Agriculture, Earl Butz, to try to encourage the U.S. Department of Agriculture (USDA) to take a higher profile in aquaculture. Secretary Butz showed no interest in a meeting or in the USDA providing such services and thus, we were left with the prospect of turning to the Departments of Commerce and Interior for certain unmet aquaculture services. Both of these agencies had given long and excellent service to the field of aquaculture as well as the U.S. Department of Agriculture. Because of the lack of interest in the Department of Agriculture, our industry gave enthusiastic qualified support to several aquaculture proposals which were discussed during the last three years. However, with the change of Administrations in 1976, the Department of Agriculture showed an increased interest in the field of aquaculture. The introduction by Senator Talmadge of S. 275, which eventually resulted in the passage of Public Law 95–113, the U.S. Department of Agriculture began to manifest a substantially increased interest in providing more services to the field of aquaculture. With the passage in September 1977 of Public Law 95–113, which authorized the USDA to provide services to aquaculture, the CFA's position on aquaculture legislation changed dramatically from what it had been in the past.

At this time, it is the position of Catfish Farmers of America and the United States Trout Farmers Association that only minimum legislation is needed in order for the Federal Government to provide the needed services to the field of aquaculture. It is the position of these organizations that a lead agency of the Federal Government is needed and it should be the Department of Agriculture.

Any discussion of Federal legislation in aquaculture should rely heavily on the report, "Aquaculture in the United States: Constraints and Opportunities," prepared by the National Academy of Sciences, under contract from the National Oceanic and Atmospheric Administration, and published at the beginning of this year. We think the Academy study is critical to an intelligent debate on any aquaculture legislation and this testimony will rely heavily on its contents. We endorse the report with a few minor reservations and one major reservation—we feel that the report should have made a recommendation for a lead agency within the Federal Government.

We think that it is imperative that any aquaculture legislation passed by Congress coordinate the involvement of all agencies. For this reason, we feel that S. 2582 should be given no serious consideration because it ignores the principal issue—that of which agency will take the lead. Further funding of one agency and leaving the other unfunded would create competition between the agencies for funds from Congress and this is the last thing that aquaculture needs. This industry must work together, and designating a lead agency will help it assure that we do indeed work together as an industry and not be fractionalized into special interests.

In regards to S. 2762 introduced by Senator Gravel of Alaska, we again wish to applaud his interest in the development of aquaculture and for presenting his most interesting proposal. The thrust of the legislation however, is so sernously flawed that it just does not represent a clear understanding of the state of aquaculture at this time. It, again, assigns the responsibility of coordinating the program to the Secretary of Commerce which is an error. The proposal for an advisory committee is not needed—the reason is that subcommittees would not only be unneeded, they would be flawed in that many of the regions, where the committees of the appointed members would

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be located, have little or no aquaculture underway at the present and little, if any, aquaculture potential. The industry is simply too small to create numerous advisory committees throughout the country. It would create unnecessary layers of bureaucracy and be devisive to the development of aquaculture. The proposed membership of the regional advisory committees would include numerous institutions who have little or any involvement or interest in aquaculture. Further, having them appointed by the governors of the various states would result in unnecessary politicizing the composition of these advisory committees and would render their work virtually worthless because of the fact that aquaculture, at this time, is such a small industry.

We acknowledge that our principal interest is in the development of freshwater aquaculture. We recognize the critical importance of the development of saltwater aquaculture and feel that the Departments of Commerce, Agriculture, and Interior each have important contributions to make in the development of saltwater as well as freshwater aquaculture. We recognize that the intelligent use of the oceans is one of the highest priorities in the future of our planet. We also recognize the critical importance of the preservation and proper development of our extremely limited freshwater resources.

In the future freshwater will become the planet's most precious commodity. It has concerned us that there has been, from almost the beginning of the deliberations on aquaculture testimony, an apparent feeling that the development of saltwater aquaculture resources is Congress' number one priority. This bias against freshwater aquaculture is most pronounced in H.R. 9370, which the Merchant Marine and Fisheries Committee reported to the House, in that it appropriated twice as much money to the Department of Commerce as to the Departments of Interior and Agriculture. It is an unwise precedent and there is no factual basis for such an action to be taken—that is, the Department of Commerce has no greater expertise or responsibilities in aquaculture than either of the other two agencies.

We assume that this Committee will, in its deliberation, be referring to the Report of the Merchant Marine Fisheries Committee on H.R. 9370 dated October 28, 1977 and thus, we would like to make several comments on the Report itself.

The Report quotes extensively the aquaculture production figures in other countries of the world in order to substantiate its claim that the United States is not doing as well as other nations in developing aquaculture. On page 20, it mentions the fact that China, which leads the world in the production of fin fish, produces 50 times more than the United States. It does not point out however, that China has been engaged in aquaculture for 2000 years and is a nation of fish eaters whereas, we are a nation of meat eaters. It refers extensively to the development of aquaculture in Japan, which like China, is a nation of fish eaters. (We note, parenthetically, that our nation will probably consume more fish. That will happen as nature takes its due course. Artificial government inducements will not accelerate the process without causing a concomitant economic disruption. The marketplace will create the proper conditions for the profitable development of aquaculture. That is, more fish per capita will be consumed when people want it, not because of large government expenditure on aquaculture programs.) It quotes figures showing that in 1965, aquaculture accounted for 6 percent of Japan's total fish and shellfish production whereas the United States figure was less than one-half of one percent in the same year. In 1970 it reports that the respective Japanese and U.S. figures were 6.8 percent versus 1.8 percent; in 1974 9.6 percent versus 3.6 percent; and in 1975 approximately 10 percent versus 3 percent. We think the 1975 figures for the United States are wrong. For the other three years the relative increase in production for the years 1965 to 1970 to 1974 shows that the portion of Japan's consumption of fish and shellfish accounted for by aquaculture increased from 6 percent in 1965 to 9.6 percent in 1974 as compared to one-half of one percent for the U.S. in 1965 to 3.6 percent in 1974. In other words, Japan increased its production over this 9 year period a little more than 50 percent whereas the U.S. increased its production seven fold.

The report goes on to state that Japan is spending $333 million for coastal fishery development programs for aquaculture. We hope that the Committee will remember the growth which the U.S. experienced with limited Federal funds when it weighs any possible authorizations and subsequent appropriations for the development of aquaculture.

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The report states that a Library of Congress study indicates that aquaculture in the United States has grown only slightly during the period 1970 to 1974, which is insignificant compared to aquaculture activities in other parts of the world. Again, we remind the Committee that these reports must be reviewed in light of relative increases in production and in terms of well established consumption habits in this country. The Library of Congress report is further quoted as saying that the annual per capita consumption of seafood products in the U.S. would increase from 12.9 pounds per year in 1976 to 15.2 pounds per year by the year 2000. It compares this to present world per capita annual consumption of about 24 pounds, mentioning that Japan and Iceland have an average per capita consumption of 79 pounds per year. The report goes on in the following paragraph to state that the demand for catfish in the year 2000 is expected to be 84 percent greater than in 1975. The Library of Congress figures on the catfish farming industry are wrong. Catfish farming will increase our demand and production by over 100 percent by 1985 and the demand for trout will increase by 60 percent in 1985. We would encourage the Committee to look into the source of this information from the Library of Congress to determine exactly who prepared this and how.

The report includes a letter from John White, Deputy Secretary of Agriculture, which states:

"This Department, with its in-place delivery system, is ready to assume the leadership for accelerating freshwater aquaculture related to fish farming. Any legislation being considered must bring together all aquaculture programs in a coherent manner and provide for new programs only after a careful analysis of the need.

"We agree that a national aquacultural plan to identify the needs, concerns, and Departmental roles is needed. In developing this plan, the Department of Agriculture must have co-equal development responsibilities along with any other department. This co-equal role is necessary because of this Department has traditionally had the responsibility to support activities of farmers operating on private land where a large part of aquaculture is practiced."

Catfish Farmers of America and the United States Trout Farmers Association endorse the role of the USDA as the lead agency for coordinating Federal aquaculture policy and practice.

We next wish to address ourselves to the debate which took place on the Floor of the House on February 15 at the time of the passage of H.R. 9370. It was pointed out that the Committee on Merchant Marine and Fisheries estimated that the bill would cost a total of $268,800,000 for the current fiscal year and the next five succeeding years. We think that this amount of money is so far beyond the scope of what the needs are for the development of aquaculture and the role of the Federal Government therein so as to be totally unreasonable. Whatever the outcome of your deliberations, we encourage that you dramatically scale down the amount of money to be appropriated if you choose to pass this legislation which we oppose.

The debate pointed out the fact that the Small Business Administration (SBA) made only eight (8) aquaculture loans amounting to $125,000 in 1975 and a grand total of two such loans in 1976 amounting to $26,000. It pointed out the SBA limit of $150,000 on direct loans. Congressman Leggett went on to point out, "Given the fact that an aquaculture facility could cost several million dollars, it is clear that existing SBA programs do not provide an adequate source of investment capital." We think that it is important for the Committee to take a look at existing and proposed aquaculture facilities to determine how large these loans really do need to be and what the need is for such a loan program. Mr. Leggett pointed out that the aquaculture loan programs administered by the USDA were restricted to businesses where the technology had been established and proven "which would effectively exclude aquaculture." We encourage the Committee to ask the credit granting agencies of the USDA what in fact is their policy on granting loans to aquaculture and if, in fact, they are not considering changing them. Mr. Leggett pointed out that the Farmers Home Administration had made seven (7) loans totaling 7.6 million dollars in 1975 and 1976 to aquaculture related operations.

The authority for such a program clearly exists within the USDA. To establish another similar program would be unnecessary duplication, would add substantial administrative costs and overhead for the creation of a new pro-

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gram, and the government would also have the problems of working out the bugs of a new program and creating delivery mechanism within the U.S. Department of Commerce which has very limited outreach compared to the USDA. We call to the attention of the Committee the discussion which took place between Congressmen Skelton and Leggett on page H 1034 of the *Congressional Record* dated February 15, 1978, where Mr. Skelton asked Mr. Leggett about the possible duplication of effort between the Departments of Commerce and Agriculture in the implementation of the loan program which Mr. Leggett's bill would implement. We feel like the question of duplication of services was not adequately addressed in the Floor Debate of the House and that, in fact, there may well be an unacceptable and unnecessary duplication of services. We have reviewed all of the testimony given before the House Merchant Marine and Fisheries Committee on this aquaculture legislation and cannot find a sufficient number of examples of businesses who were unable to find financing to justify a loan program of the magniture proposed.

During the debate Mr. Leggett in answer to a question as to whether the amounts of the bill would be $37 million answered, "that it should be compared to the $500 million spent by the one State of Alaska." This scope and thrust of the program in the State of Alaska in no way compares to the aquaculture program as proposed by Mr. Leggett and these figures have little, if anything, to do with one another.

In the House Debate, we would call the attention of the Committee members to the discussion which took place between Congressmen de la Garza, Forsythe, and Leggett, in regards to the duplication of services which would result in the establishment of the loan program. We feel that the Department of Agriculture statement before this Committee will be most interesting in light of the fact that Mr. Leggett and Mr. Forsythe both indicated "that the Department of Agriculture is not one to make loans in this area" referring to aquaculture. We trust that when the Department of Agriculture testifies before your Committee you will learn that this is not in fact the case.

It is indeed appropriate for Congress to establish a national policy for the development of aquaculture in this country and to provide certain assistance programs for the development of aquaculture. There is a role for the Departments of Commerce, Interior, and Agriculture as well as other Federal agencies in the provision of these services. However, as Assistant Secretary of Agriculture Cutler stated in his testimony before the Merchant Marine and Fisheries Committee on May 2, 1977, "The Department of Agriculture believes that the production of fish and other aquatic species under controlled conditions for commercial purposes in farm-owned or operated-ponds and other water areas to be an agriculture enterprise. The enterprise is directly comparable in scope, effect, and result to other agricultural enterprises such as the raising of livestock or crops." We are in agreement and feel that the U.S. Department of Agriculture fundamentally has the authority as granted to them under Public Law 95–113. We feel that a lead agency is indeed needed and that it should be the U.S. Department of Agriculture. The National Academy lists eight functions which the lead agency should perform and makes 11 recommendations which the lead agency should implement. We commend this to the Committee for your consideration.

A lead agency must be designated by Congress. After a lead agency is designated, Congress must give them time to propose and implement a plan. We feel that the initiative for the details on how to implement a program and the levels of authorization could best come from the Executive Branch of government and, specifically, the U.S. Department of Agriculture. Based upon their experience of working with practicing food producers they would be knowledgeable of and sensitive to exactly what could be practically done in the industry without creating disruption and yet still allowing for orderly growth. We do not feel that it is appropriate for Congress to create such a program, authorize amounts of money to be spent and tell the management of the Executive Branch lead agency what to do until the Executive Branch has had time to study all options. After it has done so, it should then make proposals to Congress which would be subjected to the scrutiny of the public, private and university sector.

Any aquaculture program established by Congress must be entered into carefully and incrementally. Any program which dramatically increases the funds flowing into the field of aquaculture from the Federal Government will create

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substantial disruption within the industry. Federal salaries are often higher than those paid in private industry. This fact will result in federally funded programs hiring away experienced personnel from private aquaculture businesses and moving them into the public from the private sector. No one will benefit from this because of the fact that there is already very limited experienced management in the field of aquaculture. This is one of our principal reasons for opposing any substantial funding in the field of aquaculture and that is, it will create an unacceptable level of competition for experienced personnel—and this is a time when the industry is critically in need of these people whom it has developed.

As with any young and highly technological industry, experienced management is limited and this situation is not expected to change for at least the next five years. The expenditure of the amount of money authorized by H.R. 9370 could not be intelligently expended and could result not only in waste, but in unnecessarily high salaries being paid which would cause massive economic disruption with the industry and result in a giant step backwards with no steps forward. Further, this amount of capital could result in universities increasing the number of fish culturists being trained and this at a time when there is already a surplus in the field of aquaculture. As an example, the *Commercial Fish Farmer* Magazine, which I publish, formally had a job placement service. Typically, we would receive 100 applications for every job opening of which we became aware. This practice was stopped a year and a half ago and the situation appears to be worse based upon the number of resumes coming into our office. This fact was pointed out on page 64 of the Academy Study on Aquaculture.

We think there is another situation which Congress should give special attention and which we feel has not been properly addressed. This is the matter which we have not mentioned previously in testimony, however, our awareness has been increased because of recent events—most notably the extensive exposure being given to the so-called "Appropriate Technology" movement by a number of leading thinkers, the most significant being the late E. F. Schumacher. The Committee's attention is called to the Academy Study comments on page 31 dealing with the potential production systems. The Report points out that to this date most U.S. aquaculture has been devoted to luxury food species that are, for the most part, high on the food chains, fed prepared diets high in animal protein, and grown in intensive production systems. This is indeed the state of aquaculture at this time and what the market is demanding. Thus, aquaculture, as we now know it, is headed in this direction and it will continue to do so, as it should. We feel that Congress should, either through legislative language or legislative intent, direct that some small part (perhaps 5 percent) of the efforts of the appropriate participating federal agencies be devoted to the development of new species which can be produced less expensively and with low technology. Attention should be given to encouraging small scale ("appropriate technology" sized) aquaculture so that farm and perhaps urban families may someday produce their own fish for their own consumption in their homes. We should be mindful of the fact that a very large number of exotic fish hobbists in this country—hundreds of thousands—grow fish in their homes. In the process they have learned a simple technology, on a small scale, to keep billions of exotic fish alive in their homes. This hobby could become the harbinger of small scale home production systems to produce fish for ones own consumption. The thrust here should be on the technology rather than the marketplace.

Finally, one last specific issue which we wish to call to the Committee's attention is the fact that we feel that not only is the USDA the appropriate agency to lead the Federal Government's efforts in aquaculture, but that the appropriate place for the consideration of this legislation is the Agriculture Committee. We are talking about the production of food and this is appropriately a concern of the Agriculture Committee. The Senate Commerce Committee does have a responsibility in the drafting of this legislation but the lead committee should be Agriculture.

We wish to thank the Committee for its interest in this legislation and encourage you to continue your support to the aquaculture programs in the National Marine Fisheries Service and the Sea Grant Program. The National Marine Fisheries Service is an extremely well administered and highly productive agency of the Federal Government. It has its ear close to the ground

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and understands the problems and needs of the industry as well as the consumer. The Sea Grant Program has been a great investment for the Federal Government and speaking on behalf of the catfish farming industry and the trout farming industry, we encourage your continued support of the program. Thank you for the opportunity to appear before you today.

Senator MAGNUSON. All right. Next is Richard Loring of the Shellfish Institute.

STATEMENT OF RICHARD LORING, PAST PRESIDENT, SHELLFISH INSTITUTE OF NORTH AMERICA, BALTIMORE, MD.; ACCOMPANIED BY EDWARD A. TOLLEY, EXECUTIVE DIRECTOR

Mr. LORING. Good morning, Mr. Chairman. I would like, if I may, to introduce Mr. Edward Tolley, executive secretary of the Shellfish Institute of North America who is here with me on my left.

Senator MAGNUSON. We are glad to have you.

Mr. LORING. I have a very brief written statement which I think I could read in very short order and give you a rundown of our ideas, if I may do that.

It is a pleasure to be here to testify before you today on the legislation to promote the development of aquaculture in the United States, primarily within the framework of H.R. 9370.

I am Richard H. Loring, immediate past president of the Shellfish Institute of North America.

Senator MAGNUSON. I want the record to show Mr. Loring has a great deal of experience in this field, and we are very glad to have you testify.

Mr. LORING. Thank you. The molluscan industry in the United States has been organized since 1908, and has members in all 22 coastal States.

Today's discussion involves principles of all marine aquaculture, not just molluscan or marine. I, personally, have been deeply committed to aquaculture for the past 20 years. I am the executive vice-president of Aquaculture Research Corp. on Cape Cod, Mass.

We have developed and are producing regular crops of hard-shell clams from our hatchery. We sell clam seed as well as grow some out to market size. We have been fortunate to accomplish this without the benefits of H.R. 9370, but it has been most difficult, and there are a great many other people who have not been as fortunate and who desperately need some assistance.

Unfortunately, there has been, of late, a great deal of confusion about what the bill does, or should do, particularly in regard to where administrative authority for aquaculture programs would be placed in the executive branch. Before discussing the specific details of the pending legislation, let me first try to simplify some of the problems that have arisen.

First and foremost, it is agreed by all interested parties that the principles of aquaculture are not only sound but essential. The world must develop other sources of food production, and in fact is. It is the United States that is lacking and falling behind.

It is true that we have successfully developed the technology to raise and grow catfish, trout, salmon, and some mollusks, namely

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oysters and clams. These businesses have their own special set of development problems.

However, these aforementioned businesses are, by no means, the end all. There are countless species of plants and animals, fresh water, brackish, and salt water varieties that need developing.

Some of these species are today being developed in the private sector. Some are being studied in public laboratories and universities. The problems of financing and technology relative to these areas of expertise are far different from the existing operations.

Thus, the only means that I can see to resolve all these differences is to seek a common ground and move forward from a position of strength.

I think, as mentioned in the previous testimony, and by the chairman, there is no question the principles of aquaculture are agreed to by all parties. I think that is probably the most essential area to move from. Some of the administrative details can be worked out almost at a later date.

Turning our attention back to the pending legislation, specifically H.R. 9370. I suppose the primary point of contention is "lead agency." Well, perhaps we can just avoid this pitfall and utilize the concept of management by committee, a triumvirate or interagency committee, if you will, comprised of the Departments of Commerce, Agriculture, and Interior. This will give the aquaculture community the best of all worlds.

There are presently 21 Federal agencies involved in aquaculture development. An interagency committee should be able to coordinate these agencies activities, and, to the extent possible, avoid unnecessary duplication of each other's work.

Coordination in this sense means, more than anything else, exchange of information. The committee's primary responsibility would be to see to it that all information on aquaculture is circulated and disseminated.

Since the bill explicitly states that no existing authority is to be taken away from any agency involved with aquaculture, there should be no fears, real or imaginary, from any agency or segment of the industry that anyone will lose something. To the contrary, we should all gain in the long run.

Senator MAGNUSON. The bill specifically provides for what the USDA has been doing. They would not lose any segment to another agency, they would continue to do their job, and we would probably give them a little more in the budget to do a better job.

That is what the bill provides. For all of them which includes Interior, NOAA, and Agriculture.

Mr. LORING. That is exactly the way we feel. I think everybody will gain in this area. Probably the other area of universal concern about this legislation is the funding problem. Some facets of the industry need large amounts of risky development funds; other elements don't need any, and, consequently, don't want any.

Here again, we have to come to a compromise. We have to look at each individual need as it arises. There are some marine interests, because of their environmental problems that are much more involved, than some land-based fresh water operations. These will simply have to be studied.

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The aquaculture industry as a whole has much to gain from the provisions of H.R. 9370. Historically, the financial assistance programs of USDA and their administration gives little hope for funding new and imaginative ventures which must predominate during the formative years of this industry. The ultraconservative loan policy of USDA precludes loans to much of the aquaculture community.

Senator MAGNUSON. This is what the Senator from Alaska was talking about.

Mr. LORING. I think today, the catfish, trout, and salmon are the only ones acceptable. Three species. Here again, the differences and needs of the aquaculture endeavors vary so markedly that it is hard to find the common ground in this area. The fresh water people, although not against this high level funding, would prefer to move slower, but while they are moving slower, they are in production.

On the other hand, the marine endeavors are much more complicated, larger in size, containing built-in hatcheries, and have a longer way to go. They need assistance now, or else the small operations will be swallowed up by big corporations with bulging research and development budgets.

Senator MAGNUSON. Doctor, that is the point that some of the people in my home State have mentioned. They fear that ocean ranching might ultimately be controlled by a big corporation rather than by small businesses. Even Indians, are trying to do something for their own group, for certain stocks, certain species, certain shellfish. This is a real problem, and I think it is something we must consider.

Mr. LORING. Just the definition of large business, small business, in the field of aquaculture seems to have a broad range. Some people feel that small business, six or seven employees, and other people in the marine areas think of small business, 60 to 70 employees, so everything is quite relevant. It will take a good deal of discussion and compromise to come up with a common ground.

Senator MAGNUSON. All right.

Mr. LORING. A solution: I think we should fund it now and look upon each case on its own merits considering some protection for ongoing operations, but be imaginative for new projects—a characteristic often lacking in Federal administrators.

Some of the more important areas to be considered concurrently with financing assistance is the need to produce an environment conducive to the development of acquaculture. The socio-bio-political constraints are prodigious, the more Government involvement, the more difficult it is to operate.

Government, unfortunately the way it is administered, has little consideration for the hard facts of life of being in business. Not only do aquaculture businesses strive to break through the technological frontier, but they must face the hard realities of all businesses—the payrolls, the funding problems—the financial responsibilities as well.

In a word, the aquaculture industry is looking for a little cooperation and consideration, not a series of energy and resource-absorbing constraints.

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It has been suggested that at whatever level aquaculture becomes administered, that there be created an "office of aquaculture advocacy" to participate in all aspects of rulemaking in Government. This is not a new concept, and in our case, it might be a tremendous boost. I hink there is such a thing in SBA today.

Senator MAGNUSON. Well, there is a parallel that the USDA should review. We are now in the throes of trying to stop the growth of agricultural corporations. We are having an argument about the 160 and the 320 acre limitations, and things of that type; and as this develops, we will have to be careful we don't fall into that same trap.

Mr. LORING. I think that is a very good point. H.R. 9370 suggests an advisory committee to assist in the initial development of the national aquaculture plan. Herein lies a key point to developing the much needed harmony between government and the private sector.

This bill is not oriented towards business, but instead toward government and research. Industry needs an active role in key decisionmaking process. Section 4 should be rewritten to recognize the importance of small business. The advisory committee should be a mandatory body which should have to approve the national plan before it is implemented, and should continue in its capacity for the life of the program, not just the initial phases.

Senator MAGNUSON. One or two of the bills, provide for a regional advisory committee. I don't know just how they fit into a national plan. We would have to take a look at that. I assume it would be by regions. But then they are getting into the same problem we got into on the 200-mile limit where we established the regional council, like the Pacific Northwest Council and the ones up in New England.

Mr. LORING. Yes. I think that regional concept may be to develop information in the beginning, to develop a plan, and not necessarily ongoing input. It is that ongoing input which I think has an equally if not more important basis to keep that government-industry communication open.

Finally, the makeup of this committee is critical. We feel that 50 percent of the committee should be from the private sector, one-half of which should be from small aquaculture operators. The other 50 percent, of course, can be made up of knowledgeable people in our universities and governmental agencies.

A small point to be also addressed is that under definitions. This worries me from the time a bill is written, the word "aquatic species" should include marine, brackish-water, or fresh water species of animal or plant to insure that we don't leave anybody out. I am looking for the strong compromise position of covering all the bases and bringing everybody in. I don't want to think that mere semantics would foul things up.

I hope I have conveyed sound and helpful ideas to you and we can move forward with some progress towards the development of aquaculture. I think H.R. 9370, with a few minor changes can do the job. Thank you for your time, Mr. Chairman. If you have any questions, I will try to answer them for you.

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Senator MAGNUSON. We appreciate the testimony you have given us. Your ideas are helpful, and we appreciate it.

It has been suggested that have some regional hearings around the country on this particular matter. Do you think that would be an effective means for industry to provide their input?

Mr. LORING. I think it is almost essential to start with some regional hearings. We, as I say, we have such divergent interests, both inland and on the coast, east coast, west coast, and in the South, it is essential to do that. Not only start that way, but we should continue that input through the life of the program.

Senator MAGNUSON. Well, we will have to take a look at that because we do have a time problem if we want to get something done in this session of Congress.

Mr. LORING. Absolutely.

Senator MAGNUSON. Some of the suggestions are very good, but there are some problems, mainly with the Administration, which have come up after the House had their long hearings, and after the House passed the bill. I don't know where everybody was before that, but now they want these changes. Maybe some of them are very good. Maybe the House bill is deficient and should be looked at, but the House passed it over a 2½-to-1 margin.

They did have some fairly lengthy hearings on the House side, and we should take a close look at their ideas because the decision of the House wasn't made overnight. It was made after lengthly hearings and quite a long discussion on the House floor.

We thank you very much.

Mr. LORING. Thank you, sir. I hope we can get some action this year.

Senator MAGNUSON. Our next witness will be Mr. Leslie Cheek, for the American Insurance Association, from the Crum & Forster Insurance Cos.

STATEMENT OF LESLIE CHEEK, VICE PRESIDENT—FEDERAL AFFAIRS, CRUM & FORSTER INSURANCE COS., ON BEHALF OF AMERICAN INSURANCE ASSOCIATION

Mr. CHEEK. Senator, you have a lot of witnesses yet to appear, so in the interest of time I will simply put our entire statement in the record.

Senator MAGNUSON. We will do that.

Mr. CHEEK. And I will summarize it as briefly as possible.

Senator MAGNUSON. We will all look at it.

Mr. CHEEK. Basically we feel that all of the bills before you contain fairly reasonable provisions relating to insurance, but that two of the bills contain some disincentives to the purchase of insurance and some other provisions that make the third bill, Senator Weicker's bill, S. 2582, the most preferable of the three from the point of view of insurance.

The reason for our feeling is that that bill contains neither disaster loan provisions, which, if abused, could constitute a form of free-after-the-fact insurance, nor authority for the Secretary to of-

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a number of coverages that we feel confident the insurance industry can make available on quite reasonable terms to the owners of aquaculture facilities.

The next point we make in our statement is that the subsidy in the insurance program should be made flexible rather than fixed at a specific percentage figure.

The reason for our feeling that way is that on the one hand, it might be possible through either reinsurance or the development of actual experience to eliminate a subsidy entirely, but that on the other hand, the costs of providing cradle-to-grave disease coverage may be so prohibitive that a premium subsidy of more than 50 percent migh be necessary. There are enough other safeguards in the bill against abuse of the premium subsidy to make us feel confident that eliminating a specific percentage figure will not do damage to the subsidy concept.

That, Senator, summarizes our testimony.

Senator MAGNUSON. Now, the thrust of your testimony is that we should discard the insurance provisions in the House bill; is that right?

Mr. CHEEK. They are not bad. The insurance provisions standing by themselves are reasonable and we so informed Congressman Leggett when that bill went to the floor in the House.

What concerns us is not the insurance provisions themselves, but the effect the disaster loans provisions might have as a disincentive to the purchase of insurance protection.

Senator MAGNUSON. In a letter to Congressman Leggett, dated October 18, 1977, which I will include in the record, you strongly endorsed the principles of the bill. Is there any change?

Mr. CHEEK. I think if you look at the letter carefully, you will see that it focuses on section 10 by itself. The thrust of the letter was that if the section is properly implemented, it is pretty good. The only concern we had was outside of that section really, that the disaster loan program might be loosely administered, and undercut the good that is in the section that deals with insurance.

I do not mean to denigrate the endorsement we gave to section 10, but rather to emphasize that there are now three bills before the committee, and that the third of them, S. 2582, is in our view the best.

Senator MAGNUSON. Well, the House bill is a working paper for us.

Now, the disaster loan might be a disincentive to purchase insurance but wouldn't an aquaculturalist prefer to pay the insurance premiums rather than pay the loan in full?

Mr. CHEEK. I think if they were prudent they certainly would.

Senator MAGNUSON. But you don't know what the premiums will be?

Mr. CHEEK. That is correct. Of course, the subsidy provision would take care of any problem of unaffordability.

Senator MAGNUSON. So that the premiums might not be a prohibitive.

Mr. CHEEK. Hopefully. The only area in which we believe there might be any problem is the coverage of disease or contamination. There, there is very little insurance experience available, and most

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of that is in England, and all the background material I have been able to come up with indicates that that coverage is quite expensive.

Senator MAGNUSON. Thank you.

We will take a look at your testimony.

Mr. CHEEK. Thank you, Senator. It was a pleasure to come before you.

[The statement and letter referred to follows.]

STATEMENT OF LESLIE CHEEK, VICE PRESIDENT—FEDERAL AFFAIRS, CRUM & FORSTER INSURANCE COS., ON BEHALF OF AMERICAN INSURANCE ASSOCIATION

Mr. Chairman and members of the committee: My name is Leslie Cheek. I am Vice President—Federal Affairs of the Crum & Forster Insurance Companies, and I appear on behalf of the American Insurance Association, a voluntary organization of 147 insurers writing all kinds of property and casualty coverages throughout the United States. The Association appreciates this opportunity to present its views on the bills designed to encourage the development of the American aquaculture industry.

The American property-casualty insurance business has a long history of participation with the Federal Government in the development of new industries (for example, the atomic energy industry) and in the provision of insurance against perils with catastrophic loss potential (for example, flood insurance).

In these cooperative, partnership arrangements, the Government has historically assumed only those responsibilities or risks that were beyond the ability of the domestic insurance industry to assume. In the nuclear energy field, for example, the Government assumed responsibility for enforcing safety measures and providing indemnity for losses above those covered by available private insurance. Similarly, in the flood insurance program, the Government was, until January of this year, responsible only for assuring community compliance with needed land use control requirements, and for providing reinsurance protection, while the industry marketed and serviced flood insurance policies.

The historical pattern of Government-insurance industry partnership has proven successful, and can be utilized effectively to encourage the development of yet another fledging industry whose risks are not yet fully known—aquaculture.

But is is unclear to us whether the bills before you, particularly H.R. 9370 and S. 2762, would permit the creation of an effective partnership arrangement for insuring aquaculture facility owners against the variety of perils they face.

Section 10 of these two bills, which are largely identical, permits the Secretary of Commerce to establish a program to insure any aquaculture facility owner against virtually any peril or liability to which either he, his facilities or his stock could fall prey. The section expressly provides that no person may be insured under the program for any risk for which insurance is otherwise available, and establishes other safeguards against abuse of the authority it grants, which together indicate that there is no intent to have the federal government provide coverage that can be obtained on reasonable terms in the private sector.

However, the two bills contain other provisions that could be utilized either to preempt the private market entirely or to compete against it on ruinous terms.

First, section 9 (Diaster Loans) contains substantial disincentives to the purchase of insurance, and could be used to subsidize aquaculture facilities at the expense of other producers of fish or shellfish. It makes loans available for many of the same purposes served by insurance, and for any damage or destruction not "fully compensated for by insurance" or for which no assistaince is available "under any other federal disaster assistance program." The Secretary is given authority to waive "any term or condition of any loan made," including any security requirement. The loan program could thus become a form of free, after-the-fact insurance for aquaculture facility

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owners. Second, the premiums for federal insurance may be reduced by up to 50 percent of the actuarial rate.

If it is the intent of the Committee to encourage the private insurance market to participate in insuring aquaculture risks, we strongly recommend first that the Committee discard both H.R. 9370 and S. 2762, and proceed with S. 2582, which contains no disaster loan provisions and limits the Secretary's insurance authority to "essential stock insurance," the only coverage which cannot now be provided by the private sector.

We also recommend that the extent of premium subsidy in section 9 of S. 2582 be discretionary. On the one hand, to our knowledge, there is no evidence before this Committee that insurance costs for aquaculture risks are now or would be unaffordable. Absent such evidence, we think it is unreasonable to allow, at the taxpayer's expense, a 50 per cent premium subsidy that may be entirely unnecessary. Indeed, some of the Association's members have suggested that *all* of the risks associated with aquaculture facilities could be insured at reasonable cost in the private sector pursuant to the reinsurance authority in section 9. If insurers could purchase protection against catastrophic losses from the Government (as they can under the federal riot reinsurance program), they could probably provide direct protection to facility owners against even normally uninsurable perils. A reinsurance approach would enable the industry to do what it does best—selling and servicing insurance policies—and would at the same time enable the Government to assure aquaculture facility owners of protection against perils not currently insured or insurable.

On the other hand, as noted below, the problems associated with providing disease and contamination coverage may necessitate a subsidy of more than 50 percent in order to make insurance protection affordable.

Let me turn now to what we understand to be the perils against which insurance protection for aquaculture facility owners is desired, and share with you our views as to which of them can or cannot be insured in the private market at rates commensurate with the risks involved.

First, with respect to aquaculture facilities, we believe that facility owners will have no difficulty in obtaining protection against the perils of fire, lightning, wind, hail, smoke, riot and civil disorder, automobile damage, etc., through purchase of the standard fire policy and its extended coverage endorsement.

Protection against flooding is available at extremely reasonable rates through the National Flood Insurance Program, provided that the community in which the facility is located has become eligible for participation in the program through the adoption of appropriate land use controls. Windstorm coverage in the coastal areas of Gulf and Atlantic Coast states subject to hurricanes is obtainable from industry-wide "windstorm pools" or FAIR Plans.

Vandalism and malicious mischief coverage and earthquake protection are available as endorsements to the standard fire policy.

With respect to the stock of aquatic species being cultured at such facilities, providing coverage against the broad range of natural and man-made perils to which the stock is exposed presents considerable difficulties. If the stock is considered as the "contents" of the facility in the same way a store owner's stock would be, coverage would be available under any of the property coverages enumerated above.

The difficulties lie in dealing with perils other than those routinely insured, and are best illustrated by the following excerpt from "Salmon Ranches and Lobster Farms," an article on aquaculture which appeared in the *New York Times* magazine on Sunday, October 3, 1976:

Given science's scanty knowledge of the biology and ecology of many sea creatures, tinkering with the life cycle of a complex species like the salmon is no small order. For instance, how do you persuade salmon to reproduce in a tank? They have been driven by instinct to leave the sea and struggle upstream to their birthplace to spawn. How do you prevent cannibalistic young lobsters from dining off one another when they are crowded together? No commercial hatchery could afford the space to give each a private room for the 18 to 24 months it takes them to mature under optimum conditions. How do you speed up the growth rate of abalone? This high priced ($7 a pound last year) and fast-disappearing mollusk needs just the right seaweed diet for five to seven years to reach market size. How can a fish farmer be

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sure his crop, raised on artificial food, won't turn out an unappetizing, unmarketable color? Salmon farmers discovered early on that, without some pigment-bearing shrimp shells in the ration, their salmon matured with white meat rather than the pink the public will pay for.

In addition, there are engineering problems, such as providing a continuous supply of clean salt water of precisely the proper temperature to speed up growth—and then disposing of the water and the wastes it carries in a way that meets government standards.

There are also legal problems—restrictions of siting, handling, marketing. And, assuming that all these problems can be solved, is it worth the effort? Will the farm-raised creatures sell and turn a profit? Not long ago a computer calculated it would cost $21 a pound to cultivate lobster—some seven times the going retail rate for the traditional sea-harvested variety. This calculation helps explain the absence thus far of commercial lobster farms.

We have been able to find only one source for insurance protection against all of the ills to which species might fall prey—Lloyds of London— and we understand that the premiums for this "all risk" protection are prohibitive.

Lloyds provides coverage in two sections, the first of which covers pollution, including malicious poisoning, and the second of which covers specific additional perils, excluding, however, disease. The additional perils coverage is subject to large deductibles. Certain Lloyds underwriters will furnish disease coverage, but again with substantial deductibles.

Disease coverage is virtually uninsurable in an intensive aquaculture operation, not only because of the normal variety of viral, bacterial and parasitic illnesses to which species are prey, but also because of the impact that attempts to alter the species' life cycles have on their morbidity and mortality rates. Furthermore, given these risks, there is a substantial moral hazard in underwriting disease coverage. Lloyds reports occasional difficulty in establishing whether the owner or another party is responsible for the loss of an insured species.

Thus, it is doubtful that the kind of "cradle-to-grave" health insurance protection the bills apparently contemplate for cultivated species can be furnished on any kind of a sound insurance basis. The disease and contamination exposure does not lend itself to normal risk assessment techniques, and may require either direct governmental subsidy or the provision of substantial reinsurance to private carriers willing to include such coverage in their contracts.

Finally, as to liability resulting from the carrying out of operations at aquaculture facilities, we believe there will be a ready market for facility owners seeking general liability protection, including the product liability component. The availability of product liability protection would be greatly enhanced by a program of Federal certification and inspection of the species produced by aquaculture facilities similar to the meat and poultry inspection programs.

We believe that aquaculture is a potentially important contributor to our economy, and we urge the Committee to give the insurance business an opportunity to participate as a partner with the Government in encouraging the development of this industry. As we have indicated, private insurers can provide most of the protection needed. We hope that the Government's role can be limited to backing us up where we cannot stand alone.

Thank you again for the opportunity to appear before you. I would be pleased to answer your questions.

AMERICAN INSURANCE ASSOCIATION,
Washington, D.C., October 18, 1977.

Hon. ROBERT L. LEGGETT,

Chairman, Subcommittee on Fisheries, Wildlife Conservation and the Environment, Committee on Merchant Marine and Fisheries, U.S. House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: On behalf of our 145 member companies, I would like to congratulate you, your Subcommittee, and the full Committee on Merchant Marine and Fisheries for their efforts to encourage the participation of insurance companies in the development of aquaculture in the United States.

Section 10 of H.R. 9370 is an encouraging response to our plea in testimony before your Subcommittee last March 28 that the Subcommittee "give the

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insurance business an opportunity to participate as a partner with the Government in encouraging the development" of the fledgling aquaculture industry.

First, section 10 recognizes that most of the insurance coverages that might be desired by aquaculture facility owners are available in the private market by requiring a finding of unavailability at reasonable cost for each of three categories of insurance protection before facility owners can obtain Government-subsidized coverage.

Second, section 10 further encourages insurer participation in aquaculture programs by incorporating our suggestion for a reinsurance program for those perils either uninsurable or uninsured at reasonable cost in the normal insurance market. The availability of reinsurance protection should provide incentives to insurers to develop new forms of coverage that may be needed by aquaculture facility owners.

Third, in recognition of the industry's desire to participate with the Government on a partnership basis in an aquaculture insurance program, section 10 permits the Secretary of Commerce to enter into contracts with insurers or pools of insurers for the performance of a variety of insurance-related functions connected with the Department's program.

Finally, section 10 recognizes the importance of objective criteria in determining both the need for and the price of Government-subsidized insurance protection. We particularly applaud the requirements that the Secretary consult with state insurance regulatory authorities and licensed rate advisory organizations in determining availability and affordability of private sector coverages.

In sum, we believe that section 10 of H.R. 9370, if properly implemented, will assure an arrangement in which the Government need assume only those responsibilities or risks that are beyond the ability of the private insurance industry to assume.

Again, we appreciate the Subcommittee's and the full Committee's thoughtful consideration of our concerns, and we congratulate you for your efforts to encourage Government-industry partnership in the development of aquaculture.

Sincerely yours,

LESLIE CHEEK, III,
Vice President—Federal Affairs.

Senator MAGNUSON. Jon Lindbergh is next.

We will be glad to hear your testimony at this time.

STATEMENT OF JON LINDBERGH, DOMSEA FARMS, INC., UNITED CARBIDE CO.

Mr. LINDBERGH. I appreciate very much this opportunity to discuss this with you. I don't go into any detail as to the advantages of aquaculture. I think all of you are familiar with it.

Briefly, we don't eat a large percentage of fish in this country, compared to other animal protein, but the percentage is increasing. People are beginning to recognize that fish and shellfish are wholesome and quite tasty. We find that we import more than half of our seafood. It creates a significant balance-of-payments problem. Perhaps some of this can be covered by taking advantage of the 200-mile fishery zone, but beyond that, the only way that we can increase our production of fish lies in aquaculture.

Aquaculture is a relatively new industry. It's relatively small yet. It has to compete with existing interests. In order to do that, we need a cohesive and supporting Federal aquaculture program.

Now, there have been several bills introduced, and my distinct impression is that a great deal of effort has gone into them, and I am fairly impressed with the way they have been put together.

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There has been some controversy built up in areas, for instance, as to what the lead agency will be, and what level of funding. I would agree that these subjects are important, but I think they are not nearly as important as developing a cohesive Federal aquaculture program.

Whatever compromising or manipulating it takes to do that, I think it should be done, but I think it is so important to have that that program enacted, that I don't think we should have it founder on what the lead agency should be or how much money should be put into it.

Senator MAGNUSON. Well, I think every witness has agreed that the basic thrust of the bill is that we should be doing much more in this field; that the Federal Government has some responsibility in the field; and that we have been lagging far behind.

It's unfortunate we have this controversy over what agency is going to do what. What we should do is take the expertise as you point out of all of them and put them together some way, somehow, and move ahead with the total program.

Mr. LINDBERGH. Right.

Senator MAGNUSON. You have had some experience in that field and you know what the possibilities are and how difficult it has been to get people interested in it. But I do think that the public now has a greater awareness about it.

We are always talking about balance-of-trade deficits in this country. This is one of our real economic problems and here we are talking about an industry that's not developed, that costs us on imports over $2 billion and which we could severely cut into if we do our job in this particular field.

That's one element that's involved.

Mr. LINDBERGH. That's very true.

Senator MAGNUSON. The issue is not what agency will have responsibility in aquaculture—because they are all doing a pretty good job—the issue is whether we must have some consolidation and coordination between the agencies to do a more efficient job.

Some work on aquaculture is now being done in 21 agencies in this Government. This is proposing some real reorganization which will get more for whatever money is put in.

Basically what are you doing now? Are you still in small salmon?

Mr. LINDBERGH. Our production at this time is in small salmon. We are diversifying into salmon sea ranching. We are also looking at a couple of other species such as shrimp and perhaps shellfish. So we are interested in various facets of aquaculture, both in freshwater and in saltwater.

Senator MAGNUSON. We are trying to start construction on the Manchester place and I think we will get it done this year. It's been standing there a little too long.

Mr. LINDBERGH. I think for the first time this year, construction will start. I remember when you designated the spot. It must have been 6 or 8 years ago.

Senator MAGNUSON. You mentioned in your statement that in order to make aquaculture competitive in many subspecies, trout, catfish, salmon, the feed price is a definite factor as to whether it can be competitive or not.

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Mr. LINDBERGH. This is a very strong factor in the salmon and trout areas and very likely in others. Feed is at least half of our cost. And it will be very important in that segment of aquaculture to have food available at a reasonable price. It's an area that the Federal Government can put in a very significant contribution that covers quite a broad sector of the field of aquaculture.

Senator MAGNUSON. I believe this committee should have a conference with FDA because pharmaceuticals are also becoming a problem, with what they will certify and what they won't certify.

Mr. LINDBERGH. It's a problem mainly on the basis that the aquaculture industry itself is quite small. I don't disagree at all with the FDA position that new drugs and pharmaceuticals have to be tested very carefully, but somebody has to do the testing. A small industry can't afford to put the hundreds of thousands of dollars involved into certifying a drug. A drug company is reluctant to put that kind of money into a drug which at this point has a quite small sales potential. It can't be larger until the industry grows, but the industry is at times constrained by the lack of drugs and medications.

I think that the Government can break this chicken-and-egg problem.

Senator MAGNUSON. Now, you pointed out in your testimony that the control of aquaculture, however, tended to be fragmented and disorganized. Well, that's the way it is right now. There are many regulatory agencies involved, from the local to the Federal level. And, they often do not coordinate with each other. At times their demands are in conflict and costly to meet in order to remain in compliance with the many regulatory bodies. In addition, it takes months and years and expensive efforts to obtain permits to comply with such regulations.

Do you agree that these bills are at least some effort to coordinate and consolidate this?

Mr. LINDBERGH. I agree completely. I read the Gravel bill yesterday, and it occurred to me that they addressed this problem quite well. I might say a large company, such as the one I work for, can perhaps expend the time and money and efforts to develop or to acquire a permit. Even for a large company it is a problem. For a small company it's almost impossible in many cases. I think small companies very definitely should be a part of aquaculture.

Senator MAGNUSON. There has been some concern about this, and we are going to have to take a good, long look at it.

Mr. LINDBERGH. The salmon aquaculture industry feels that the private sector should be included in salmon enhancement through salmon sea ranching. Private salmon sea ranching will provide more salmon in the public domain—at sea—at no cost to the taxpayer. The private operator harvests his crop only after they return to the release point. We in the salmon sea ranching business see little negative effect to the sport fishery, the commercial fishery, or the consumer. We do see more high quality salmon for everyone.

I know there is concern, particularly among the commercial fishermen as to what the effects of private salmon sea ranching would be. I understand that they are concerned, that they have had to live with particularly the *Boldt* decision in this last couple of years.

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Conversely, the market is constrained from growing by the lack of an adequate battery of effective and certified chemicals and pharmaceuticals.

At the present time, there are only a few chemical and pharmaceuticals which have been certified by the FDA (and in some situations the EPA) for commercial use in aquaculture. There are certain others which have been used extensively in the past but have not been certified. Also, some agents which have been certified now require re-certification in the near future. Existing aquaculturists and potential investors are seriously concerned about the situation with chemicals and pharmaceuticals.

1. They feel vulnerable to a disease organism which develops resistance to the few certified medications. There is often no back up treatment and catastrophic loss could result.

2. They are apprehensive that even those few certified materials will be decertified, leaving growers completely vulnerable to the known effects of existing diseases.

The above are severe constraints to aquaculture and strong federal effort is needed.

A diverse list of regulations, restrictions, and permit requirements often act as strong constraints. New industries should have some control and overall management to assure that they develop in an orderly manner compatible to society in general. Control of aquaculture, however, tends to be fragmented and disorganized. Dozens of regulatory bodies are involved from the local to the federal level. They often do not coordinate with each other and at times their demands conflict. It is costly to meet and remain in compliance with the requirements of many regulatory bodies. In addition, it takes months and often years of the most rigorous and expensive efforts to obtain necessary permits to initiate aquacultural production. Understandingly, many potential aquaculture operators and investors become discouraged and abandon their programs.

As described by Senator Gravel, the enhancement and rehabilitation of traditional fisheries is an important objective of aquaculture. The salmon fishery in the northeastern Pacific is an example. The salmon aquaculture industry feels that the private sector should be included in salmon enhancement through salmon sea ranching. Private salmon sea ranching will provide more salmon in the public domain (at sea) at no cost to the tax payer. The private operator harvests his crop only after they return to the release point. We in the salmon sea ranching business see little negative effect to the sport fishery, the commercial fishery, or the consumer. We do see more high quality salmon for everyone.

Thank you for your consideration.

Senator MAGNUSON. We will recess until 2 o'clock.

AFTERNOON SESSION

Senator MAGNUSON. Our first witness this afternoon will be Mr. Haw, Deputy Director, Washington Department of Fisheries, General Administration Building, Olympia, Wash.

STATEMENT OF FRANK HAW, DEPUTY DIRECTOR, WASHINGTON DEPARTMENT OF FISHERIES, GENERAL ADMINISTRATION BUILDING, OLYMPIA, WASHINGTON

Mr. HAW. We are generally pleased that Congress is recognizing the importance of aquaculture in the future of our country and the world. In our own State, we are proud of the contributions made in shellfish culture and in rearing salmonid fishes.

My comments today will deal primarily with the establishment of private sea ranching facilities in Washington State.

Salmon culture has been a specialty in our State for many years. Recent annual production of young seaward migrant salmon from

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Washington State hatcheries, totals about 200 million fish weighing some 4.2 million pounds. To put this in perspective, although we produce fewer in numbers, this is about four times the current poundage of salmon released into the Pacific Ocean by the Japanese.

In addition to this current high level of production, and in response to contemporary circumstances, notably the Treaty Indian fishing issue, the Washington State Legislature, during the 1977 session, appropriated $33 million for new salmon culture facilities designed to add 4.2 million new salmon each year to the State's public fisheries.

We are not now talking about the number of fish released. We are talking about 4.2 million new fish in the actual catch. That would be about a 60 percent increase in the current level of Washington's total salmon harvest.

On top of this, on top of the current program and the new State enhancement, President Carters' Regional Task Force on Northwest Fisheries has recommended an additional expenditure of about $90 million for capital construction designed to double the existing State-wide salmon harvest. About $33 million of this will be additional State salmon programs. The rest would be Indian and other enhancement programs.

The one issue that Treaty fishermen, nontreaty commercial and recreational fishermen, arbitrators, and bystanders seem to agree upon is that the best solution possible to the current salmon mess in Washington State will involve producing more fish for public harvest.

I see by this morning's telegram, apparently there's one other issue they seem to agree on.

Senator MAGNUSON. They agreed that this is a good bill, but they want their views heard.

Mr. HAW. I think that is right.

Private salmon sea ranching—release and capture—is not now broadly viewed as part of a solution to current local problems in Washington State. State legislation authorizing private sea ranching, on a very limited and controlled basis, failed to pass during the last two sessions of the Washington State Legislature. A primary reason for this is that, right or wrong, many fishermen, and at least some processors, view private sea ranching as another threat to their future.

The State of Washington is now heavily involved in public sea ranching. Our goal is to manage the existing public fisheries so that every fish not required for seed stock, enters the public catch. A variety of experiments have shown that variations in species, stocks and rearing practices can greatly influence the portion of a run that enters the public catch.

For example, some stocks of coho salmon yield only about one fish to the public catch for every one returning to the facility. In other coho stocks, because of migration patterns and run timing, the ratio is ten in the catch for every one back to the facility.

The State, of course, is after the one that produces 10 in the catch for every one back to the facility.

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We have also noted that chum salmon are very much in demand in the State of Oregon for private sea ranching. One reason for this may be that chum salmon are not readily taken on hook and line gear which is the only legal method employed along the Oregon coast. So, obviously, the chum program along the Oregon coast doesn't contribute much, because chums don't bite hook and line gear.

The point I am making is that motivation in salmon sea ranching can have a significant impact on the magnitude of yield to the public catch.

So it depends on what your goals and objectives are. The State's goals and objectives are to put all the surplus into the public catch.

At this particular time, our other concerns with private salmon sea ranching in Washington are as follows:

1. Under existing interpretations of the so-called "Boldt Decision," it appears that salmon harvested by private sea ranchers would count toward their respective "treaty share," thus impacting those participating in the public fishery.

2. The ocean salmon range is currently being used and in view of the massive new enhancement programs underway along the coast, there are some concerns being expressed regarding carrying capacity. Private sea ranching could decrease survival rates of "wild" salmon and those fish produced in public facilities. Obviously, we have a lot to learn along these lines. We have become concerned recently with the coho program on the Columbia River, and currently Federal, State and local biologists are looking into that. We have found, with the Columbia River hatcheries, that the coho catch has not increased in proportion to the increases in production of the species. Over-loading the estuary is of particular concern.

3. Competition with private industry for desirable salmon rearing sites would increase the cost of land and water desired for public enhancement facilities. Right now our experience with our salmon enhancement programs in Washington State is that land and water are the best buy and the reason for that——

Senator MAGNUSON. Off the record.

[Discussion off the record.]

Senator MAGNUSON. Please proceed, Mr. Haw.

Mr. HAW. We note that section 4(d) of House Resolution 9370, the same provision appears in S. 2582, I haven't seen the other one, these sections appear to be designed to insure that an aquaculture program dependent upon the utilization of a particular state's waters will not be developed when that state has prohibited the use of its waters for that purpose.

Senator MAGNUSON. We don't want these bills to usurp the state rights or whatever the state wants to do with their own waters. We are being very careful about this. These bills would not interfere with whatever decision the State of Washington makes.

Mr. HAW. I think it is very important, Senator, that the fishermen be made aware of that.

Senator MAGNUSON. The last thing that I personally would want to do is to have these bills interfere with your rights.

Mr. HAW. I think when I was reading my testimony, I left out point 4, which was perhaps the most important of all the points.

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That is, private salmon sea ranching in Washington would increase an already high level of paranoia among user groups and thus lessen the chances for a timely solution to existing problems. And I think that is one of the most important things.

Senator MAGNUSON. You can tell the people at home that we will not go ahead with markup on these bills that we have until we hear their views.

Mr. HAW. Thank you, Senator.

Senator MAGNUSON. It has not been decided whether they have to come to Washington, D.C. or whether we do it in Washington State.

Off the record.

[Discussion off the record.]

Senator MAGNUSON. Thank you very much for your testimony.

Our next witness is Dr. Shell.

STATEMENT OF DR. E. WAYNE SHELL, HEAD, DEPARTMENT OF FISHERIES AND ALLIED AQUACULTURES

Dr. SHELL. Senator, I certainly appreciate the opportunity to appear before this committee to offer a few thoughts concerning the proposed legislation.

I am Wayne Shell, head of the Department of Fisheries and Allied Aquacultures at Auburn University in Alabama. The university has been in the business of meeting fish farmer needs since 1934. In these years, we have worked with fish farmers in our county, the State, the region, the Nation, and around the world.

I have followed the legislation in question with a great deal of interest. I appeared before the House Subcommittee on Merchant Marine and Fisheries in March 1977, concerning H.R. 1833, which was later enacted at H.R. 9370. In testimony presented at that time, I strongly supported the proposed legislation in principle but strongly opposed certain specific parts. The effect of my eloquent testimony is indicated by the passage of the legislation with all of the objectionable sections intact.

I have a prepared written testimony and request it be put in the record, but I have a few comments that I would like to make.

Senator MAGNUSON. We will put it in the record. Now please proceed with your comments.

Dr. SHELL. I have attempted to summarize my testimony. It will only take a few minutes. These are general comments that I hope will be of value to the committee as they deal with the legislation in question. My first comment: Over the years, in dealing with fish farmers, we felt that the most critical needs for fish farming in the United States was for USDA to take a strong positive stance regarding the culture of aquatic food and for aquaculture to achieve equity under the law. With the arrival of the new administration in USDA and the passage of Public Law 95–113, both of these crucial needs have been met. Assuming that USDA carries out the congressional mandate, imposed in Public Law 95–113, and assuming that Congress funds the USDA initiative, aquaculture will develop rapidly in the country.

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My second comment: It is my feeling that the agency that leads a conglomeration of Federal bureaucracies in meetings to "show and tell" is of little consequence. What is important, is who takes the leadership role to meet the needs of fish farmers? For 99 percent of the practicing fish farmers in the United States, present and future, that decision was made when Congress passed Public Law 95–113 and when the Secretary of Agriculture made the decision to bring aquaculture out of the cold in that department.

My third comment: Regarding the variety of legislative advantages called for in the bills in question. I want to remind the committee of a wise old proverb. I am sure you remember this one: "Bring up a child on the way it shall go, and it will not depart from that path when it is old."

Let me paraphrase this old saw, "bring up aquaculture without undue federal assistance when it is young and hopefully, it will not depart from that path when it is old.

I could not help but take note of your earlier comments regarding problems with regard to agriculture legislation. I hope we are wise enough regarding problems resulting from Federal involvement in food production in agriculture to avoid similar problems for aquaculture.

A fourth comment: The best possible thing that could happen to mariculture, at the present time is to experience approximately 10 years of reduced public expectation. With good luck, it will take that long before systems for commercial farming of shrimp, lobster, oyster, pompano, striped bass, and red snapper will be ready to come on line. A word of caution here: Regardless of what we might hear, the jury is still out on commercial mariculture in the United States. Without some specific legislated advantages for aquaculture with regard to coastal zone management and marine capture fisheries, the future of sea farming is in limbo.

This concludes my testimony. I will be happy to answer any questions you might have.

Senator MAGNUSON. I have only one question. Do you agree that we should be doing something about coordinating and consolidating the aquaculture area since it is scattered among 21 agencies?

Dr. SHELL. Yes, sir. It is scattered. I am reminded of other attempts to pull things together in the Federal Government. It is an extremely difficult thing to do.

Senator MAGNUSON. It will be up to Congress to decide who it will be. The bill specifically states that no Department—such as Agriculture Department which has been doing a good job—should be interfered with. It seems to me that our goal for aquaculture shouldn't be jeopardized by arguments between the various agencies.

Dr. SHELL. I agree with you.

Senator MAGNUSON. The Agriculture Department has done a yeoman's job, in the field of freshwater fish, but now we are trying to branch out into the saltwater area.

I cannot understand why these agencies can't get together and why they have to fight among themselves. After all, they all have to come up to us for some money.

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We cannot leave aquaculture alone just because there is an argument between these agencies. We must move ahead and have someone coordinate this entire area.

This is what we are talking about.

You mentioned in your statement that we all voted "yes" on the question of assigning lead agency responsibility for aquaculture to the Department of Agriculture. Well, that was in context of freshwater experiments. It wasn't talking about salmon, shellfish or crab, or any area of saltwater. We never suggested that the Agriculture Department should go beyond that field, but we just wanted to give them ample authority within the field that they are working.

What they are doing goes beyond that. This requires the expertise of NOAA and Interior. I have dealt with these bureaucrats downtown for many years, and I can understand how they all want their own turfs.

You do agree with the basic principles in the bill and believe we should be doing more?

Dr. SHELL. I think we should. What I think has been the problem is that we could not get USDA involved in aquaculture. We were concerned that some other department would take over aquaculture before we could get USDA involved. Now that we have them involved under Public Law 95-113, I think the fish farmers will be more flexible on the idea of a lead agency.

Senator MAGNUSON. I don't think that will happen. We are going to protect what is being done in the departments now. When we all want to put something together—we all want to do more and the whole field should be expanded.

As a matter of fact, USDA has done a terrific job with what limited resources they have had to do it. All right. Off the record.

(The statement follows:)

STATEMENT OF E. W. SHELL, HEAD, DEPARTMENT OF FISHERIES AND ALLIED AQUACULTURES; DIRECTOR, INTERNATIONAL CENTER FOR AQUACULTURE, AUBURN UNIVERSITY, AUBURN, ALA.

My name is Wayne Shell. I am Head of the Department of Fisheries and Allied Aquacultures and Director of the International Center for Aquaculture at Auburn University. Auburn has been involved with the development of aquaculture since 1934. We probably have been more closely associated with the development of the inland aquaculture industry in this country than any other American Institution. Since 1967 we have been deeply involved in the development of aquaculture in the emerging nations of the world. In fact, we have during this time assisted 54 of these nations in a formal manner.

I appeared before the House Committee on Merchant Marine and Fisheries in March, 1977 concerning H.R. 1833 which was later enacted at H.R. 9370. In testimony presented at that time I strongly supported the proposed legislation in principle but strongly opposed certain specific parts. The effect of my eloquent testimony is indicated by the passage of the legislation with all of the objectionable sections intact. The thrust of my testimony before the House Committee was that aquaculture is fully capable of competing with other types of businesses in this country for land, labor and capital, that it requires no special recognition or legislated advantages, and that if afforded equity under the law it would develop into a strong, viable segment of America's food production system.

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In 1977, the 95th Congress passed several pieces of really significant legislation. One of these was the Food and Agriculture Act of 1977 (PL 95–113). This legislation was discussed and debated at length by both houses during the hot summer months. Finally at the end of a long and trying period Congress put its stamp of approval on the Act. It was passed by an overwhelming vote of both houses. The Senate approved the Conference Report by a 63–8 margin.

Over the years aquaculture has received virtually no attention from Congress and little more from the Executive Departments; however with the passage of PL 95–113 Congress seemed to finally say that aquaculture was important enough that someone at the Federal level ought to look after it. There are some really significant statements in that legislation that are relevant to this hearing. Let me remind you of some of them.

In Section 1402(8) of PL 95–113 Congress plainly states that "New Federal initiatives are needed in the areas of—(D) aquaculture research and extension."

In Section 1403, Congress (including the senators on this Committee) indicates that one of the purposes of the title is to—(1) "establish firmly the Department of Agriculture as the *lead* agency in the Federal Government for the food and agricultural sciences."

In Section 1404(8) Congress (including the Senators on this Committeee) made a sincere effort to clarify the language of the Act by defining "food and agricultural sciences" as "science relating to food and agriculture in the broadest sense, including the social, economic and political considerations of—(D) aquaculture."

It was a wise decision on the part of Congress to designate the Department of Agriculture as the lead agency for aquaculture. The cause for aquacultural development will be much better served with the Department of Agriculture as lead agency. The most obvious reason is that aquaculture is farming. No other Department has the experience or the mechanisms for effectively backstopping farm activities. Most of the aquaculture in the U.S. is now practiced on private farms and most of the development of aquaculture is expected to take place on private farms. There are approximately 19,000 ha of catfish farms in the U.S., 16,000 ha of bait minnows, 20,000 ha of crawfish ponds and significant acreage of commercial trout ponds and raceways. In addition there are approximately 2.5 million private ponds on farms in which aquaculture, usually for sportfishing, is practiced. Virtually all of these various aquacultural enterprises are on private lands and many are operated as part of an overall farming enterprise. The primary responsibility of the Secretary of Agriculture has been to support the activities of farmers operating on private lands. The Agricultural Experiment Stations, The Cooperative Extension Service, the Production Credit Association, the Soil Conservation Service, to name a few, are already in place and are providing services to these farmers.

Apparently Congress did not take lightly its decision to assign the responsibility for aquaculture to the Department of Agriculture. It significantly altered, long-standing legislation to include aquaculture under the Congressional mandate. Section 1502 of PL 95–113 amended Section 520 of the Revised Statutes, as amended (7 U.S.C. 2201) to include aquaculture among the basic functions of the Department of Agriculture.

To provide fish farmers equity under the law, Congress, through Section 1503 of PL 95–113 amended Section 32(e) of title III of the Bankhead-Jones Farm Tenants Act (50 Stat. 526, as amended; 7 U.S.C. 1011(e)) and Section 310 B(a) of subtitle A of the Consolidated Farm and Rural Development Act (86 Stat. 663; 7 U.S.C. 1932(a)) to provide a loan authority for aquaculture.

An analysis of the Act would indicate that in its wisdom Congress had finally decided that some positive action should be taken with regard to aquaculture at the Federal level and that the U.S. Department of Agriculture would be the Agency assigned the responsibility to carry out the Congressional mandate. It also appears that Congress designed the Act to provide aquaculture with the equity under the law that is needed.

We often hear rumors (unsubstantiated of course) that Congress does not always have the ful confidence of the peope back home. I think I might see how some of these rumors get started. In September 1977, the Congress of the United States stated unequivocally in PL 95–113 that the Department of Agriculture would be the lead agency for aquaculture in the Federal Government.

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Then early this year the same House of Representatives that had voted overwhelmingly in support of PL 95–113, voted overwhelmingly again through H.R. 9370 to assign lead agency responsibility to the Department of Commerce. Now we are meeting with Senators who last year also voted overwhelmingly in support of PL 95–113. On September 9, 1977, members of this Committee joined their fellow Senators in approving the Conference Report on what was later to become PL 95–113 by a 63–8 vote. Every member of this Committee that voted, voted "yes" on the rollcall vote. Senators Magnuson, Cannon, Long, Hollings, Ford, Durkin, Zorinsky, Stevens, and Danforth all voted "yes" on the question of assigning lead agency responsibility for aquaculture to the Department of Agriculture. This Committee is now meeting to hear testimony on two pieces of proposed legislation, S. 2582 and H.R. 9370, that if enacted would designate the Department of Commerce as lead agency for aquaculture.

For several months now those of us who are involved in fish farming on a daily basis have thought that at last there was a clear Congressional mandate from positive leadership at the Federal level for aquaculture. As a result of PL 95–113 we have already seen some significant progress in the Department of Agriculture with respect to aquaculture. There seems to be every indication that the Department intends to carry out the intent of Congress quickly and effectively. However, as a result of the passage of H.R. 9370 in the House and with serious consideration being given to that and other bills in the Senate, it would seem that what we thought was a clear Congressional mandate for progress in aquaculture under PL 95–113 was really a mandate for confusion.

In summary I recommend that these bills not be reported out of Committee. The Senate has already provided all of the legislative push that aquaculture needs at this time. If this Committee sincerely wishes to provide assistance for aquaculture, it should do two things. First, the Committee should see to it that the aquacultural program of the Department of Commerce is adequately funded and that funds expended by the National Marine Fisheries Service and Sea Grant for aquaculture are effectively utilized. These agencies together have spent millions of dollars annually for many years on aquaculture research and development and there is little indication that we are any closer to bringing shrimp, oysters, lobsters, pompano, or other mariculture species into commercial production than when they began their work. A second thing that the Committee might do is to make recommendations to the Senate concerning the responsibilities of a Federal lead agency for aquaculture. I served last year as a member of the Committee on Aquaculture, Board on Agricultural and Renewable Resources, Commission on Natural Resources, National Research Council. In the resulting report issued by the National Academy of Sciences, "*Aquaculture in the United States, Constraints and Opportunities*," the Committee strongly recommended the establishment of a lead agency. Further we proposed some responsibilities for the lead agency. Following are the results of our deliberations essentially as printed on pages 93–95 of the Report. I recommend them to you as a point of departure in helping to define the responsibilities of the Department of Agriculture as it moves to implement the Congressional mandate. The lead agency should:

(1) Take steps to develop appropriate means to coordinate activities among other Federal agencies with aquaculture programs,

(2) Annually submit a report on aquaculture in the United States to the President and the Congress containing a review of existing problems, progress to date, the allocation of funds, and an outline for action,

(3) Develop an integrated program that recognizes the assets and skills of existing aquaculture programs within other Federal agencies. Such a program should include a National Aquaculture Plan that specifically considers the resources of other Federal agencies and contains a timetable for action,

(4) Disseminate information concerning Federal and State permits and licenses necessary for aquaculture operations and facilitate their acquisition.

(5) Develop and promulgate guidelines for state use in enactment of laws and regulations relevant to aquaculture development,

(6) Encourage the U.S. Environmental Protection Agency to review and establish specific effluent guidelines and standards for aquatic animal production,

(7) Initiate with the U.S. Fish and Wildlife Service a review of the Lacey Act (18 U.S.C. 42) to: (1) identify species of importance to aquaculture; (2) establish a mechanism permitting entry of such species if the public interest

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will be best served by such entry; (3) develop and distribute to state authorities model regulations for interstate aquatic species disease certifications; and (4) compose and publish a listing of species whose entry into the United States is controlled by statute, but which are approved for use in aquaculture under specified conditions,

(8) Ensure that aquaculture enjoys parity of opportunity with related food production systems in terms of regulations, governmental support and insurance programs, and small business development programs,

(9) Take legal and administrative steps to clarify the rights of both public and private hatcheries to harvest the ocean stocks they have planted,

(10) Coordinate efforts directed at obtaining funds from Congress for aquaculture activities and,

(11) Ensure adequate long-range research and development in aquaculture which requires a level of funding that cannot be sustained by private business.

Thank you for providing me the opportunity to give this testimony.

Senator MAGNUSON. We are all through then. We will put Mr. Skoog's testimony in the record in full. Thank you very much.

[Whereupon, the hearing was adjourned at 2:45 p.m.]

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ADDITIONAL ARTICLES, LETTERS, AND STATEMENTS

CORDOVA DISTRICT FISHERIES UNION,
Cordova, Alaska, April 6, 1978.

Hon. MIKE GRAVEL,
U.S. Senate,
Washington, D.C.

DEAR SENATOR GRAVEL: We have just received the copies of your Senate Bill No. S.2762 and unfortunately because of time constraints caused by the April 17 hearing date, we will not have the opportunity to repeatedly review for adequate comments.

I have received Prince William Sound Aquaculture's comments and suggested modification in detail, and feel that CDFU can certainly support these changes and commend PWSAC for a job well done.

One minor change we might suggest beyond what PWSAC has contributed is on page 31, line 2, delete the following words, "a natural disaster or." Possibly, natural disaster should be inserted with disease, pollution, or contamination. It seems unrealistic not to allow disaster loans for the most uncontrollable type of disaster, unless this specific enterprise is covered under some other federal disaster program which readily would accept applications for funding aquaculture.

I would also like to re-emphasize the importance of Section 7. Contracts and Grants, without a matching grant program there is no immediately visible value of this legislation as it relates to Alaska's version of salmon aquaculture. As you well know Regional Private Non-profit Aquaculture with permit control held in the hands of Regional Planning Teams and the Commissioner of the Department of Fish & Game, is the name of the game in Alaska. Regional Private Non-profit Aquaculture has to benefit the common property fishery. Being under this obligation, facility sitings are strategically located to provide for maximum interception by the common property fisheries and, therefore, as a practical matter will be unable to function or meet depth service requirements if obligated to the total costs of construction and development operations.

We do not pretend to be knowledgeable enough to offer specific terminology changes which would assure our needs are met, nor do we actually know that this might be possible within the bill itself. However, it would be much appreciated by all Alaskan salmon fishermen if this crucial area of the bill was considered in whatever way possible with our needs in mind.

This bill has great potential for assisting salmon aquaculture in Alaska which was lacking in the Legget Bill. We would like to sincerely thank you for your endeavor on this matter.

Sincerely,

BOB BLAKE,
Chairman.

UNITED FISHERMEN OF ALASKA,
Juneau, Alaska, April 11, 1978.

Senator HOWARD CANNON,
Chairman, Senate Commerce Committee (Attention of Doug Anderson),
Russell Senate Office Building, Washington, D.C.

Dear SENATOR CANNON: We are an association of commercial fishermen and organizations from throughout Alaska representing all gear types and all fisheries. We are the only such organization in the State and as such we speak for a large percentage of Alaska's commercial fishermen and their families.

As an association which worked hard and long at the development of aquaculture legislation and activities in Alaska, we have a keen interest in the

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national legislation now approaching the final stages before passage. We, together with the regional non-profit aquaculture associations in Alaska, feel that a slightly different approach than that incorporated in H.R. 9370 would better suit the needs of Alaska with its unusual non-profit approach to aquaculture activities. I would like to outline briefly those concerns and ask that you give them your consideration as you deliberate the legislation before you.

Our primary concern is the role the states will play in relation to that of the federal government as regards the development and formulation of plans. We prefer the approach incorporated in S. 2762. That bill provides for regional input during the planning stages which would help to assure that programs will be based on the environmental and biological concerns unique to each area. We believe that the federal aquaculture activities should strive to support state and local aquaculture programs peculiar to the many regions of the country.

Though basically in agreement with the manner in which the advisory committee system is set up in S. 2762, we would like to suggest that for purposes of clarification a minor amendment be made to section 4(2)(B)(i) on page 8. Change "composition" to "boundaries" on line 17. The term "geographical composition" is ambiguous. We want to see the geographical boundaries similar to those created under the Fishery Conservation and Management Act of 1976. However, we would like to see the composition of the advisory committee limited to those within those geographical boundaries who share an interest and concern for aquaculture activities.

As a state with publicly owned fishery resources, we are pleased with the attention you have given to rehabilitation and enhancement activities. We do not find this same emphasis in H.R. 9370 and hope that if that should prove to be the legislation to achieve final passage, amendments will be added to assure this emphasis. Obviously it makes sense to encourage projects which compliment and enhance rather than those which conflict or replace natural production.

It sems appropriate that the regional subcommittees be given the responsibility for identifying priority species since they will be most aware of State of Alaska and within-the-State regional goals. For this same reason, we believe that the Secretary's role in regard to development programs be limited to reviewing, approving, and implementing plans.

In conclusion, we want to state our support for S. 2762 which better meets the needs of Alaska fishermen than H.R. 9370. We hope that you will favorably consider the differences incorporated in Senator Gravel's bill, S. 2762. Those differences would better serve the needs of the fishing industry in Alaska and would in no way detract from industry needs elsewhere in the United States.

Sincerely,

SHARI GROSS, *Executive Director.*

SOUTH CAROLINA WILDLIFE & MARINE RESOURCES DEPARTMENT,
Charleston, S.C., April 24, 1978.

HON. STROM THURMOND,
Senate Office Building,
Washington, D.C.

DEAR SENATOR THURMOND: I am writing to alert you to our interest in several pieces of aquaculture (farming of aquatic organisms) legislation currently being considered in the United States Congress, particularly H.R. 9370 and S. 2582.

Our Institute has been heavily committed to practical aquaculture research since its establishment six years ago, and our predecessor agency under the late Dr. G. Robert Lunz pioneered certain kinds of aquaculture experiments in this country. We believe that aquaculture can have a bright future in South Carolina if it receives the support it deserves. As far as traditional fisheries are concerned, aquaculture presents one of the few alternative means of *increasing* domestic production and decreasing our reliance on imports. Such imports today account for *more than half* of all seafood consumed in the United States and thus contribute to our overall negative trade balance. Aquaculture *can* increase domestic production of quality seafood, but only if it receives the support necessary for its development.

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The climate of South Carolina appears to be well suited for several kinds of aquacultural activities, and we believe that aquaculture could eventually become a significant element of our state's economy. Perhaps more importantly, we believe that aquaculture could play an important role in improving the economic position of South Carolina's, and the nation's, farmers. However, such important strides will not take place overnight. Because it is risky and in many cases unproven, aquaculture requires government support for research and development efforts and especially to translate the results of laboratory experiments into commercially viable technology.

As a scientist with six years of experience in the area of aquaculture, I feel deeply the need for a national aquaculture initiative to draw together the diverse efforts underway in many areas of the country and to provide the kind of sustained support necessary to bring aquaculture from the laboratory to industry. In my opinion, South Carolina and many other areas of the United States have great potential for aquacultural development, and I respectfully solicit your support of this legislation. Also, I have enclosed a copy of the March 1978 issue of the "Commercial Fish Farmer" magazine. This issue describes the burgeoning development of aquaculture in Hawaii. With your support, such development can take place in South Carolina.

Thank you for your consideration of this matter. If I can be of assistance to you in any way, please do not hesitate to contact me. Also, we would be most pleased to have you visit our facilities at any time convenient to you.

Sincerely yours,

PAUL A. SANDIFER, *Ph. D.*,
Assistant Director, Marine Resources Research Institute.

MARINE BIONICS, INC.,
Simi Valley, Calif.

This testimony on the National Aquaculture Organic Act of 1978 (H.R. 9370) is being introduced as a means of putting on record the small businessmen's views of those points which are relevant to and necessary in order to proceed from small experimental projects to a viable national industry.

Aquaculture, which is the farming of fresh and salt water organisms, is on the verge of budding forth as a means of providing the world an almost limitless supply of high quality low cost food.

The United States is in a position to become a world leader in this new frontier; however, the immediate development of a cohesive national plan to bring together the vast array of disjoint projects underway and provide coordination of effort and direction is imperative.

The immediate involvement of the United States in aquaculture and mariculture program will provide several distinct advantages, an immediate goal will be to make the U.S. self sufficient in sea food production, reducing balance of payment deficiencies and providing a strategic resource in exportable products and technology.

Mariculture; or sea farming, has several major advantages over current seafood acquisition methods in that the sea is treated as a finite resource which must be cultured rather than harvested. Mariculture will provide: higher yields at lower cost to the consumer, prevent depletion of coastal and open waters, protect endangered species and maintain the seas as balanced ecosystems.

In any national plan, provisions for the intelligent and prudent allocation of marine resources should be made in a manner that precludes monopolies and promotes competition in keeping with the free enterprise system.

We believe that the following areas should be covered in the short term to provide a rapid and continuous growth of U.S. Aquaculture.

A. Definitions, which we feel would serve to facilitate the implementation of this act.

Aquaculture should apply to the culture of all fresh water aquatic species.

Mariculture should apply to the culture of all salt water aquatic species.

State lands should apply to all areas of culture located on dry land and includes waters no more than three miles offshore from mean low tide.

Federal lands should apply to all marine areas between state lands and the 200 mile U.S. Territorial limit.

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B. Provision of a uniform set of laws and regulations.

1. The enactment of legislation to define state controlled and federally controlled ocean bottoms and open waters is essential in the elimination of confusion in the granting of leases, licensing, overall jurisdiction and security.

2. Laws should be upgraded to provide appropriate penalties for poaching, theft, and willful destruction of mariculture stocks, equipment or support equipment as substantial sums must be invested in mariculture projects. In providing uniform laws and regulations, the matter of licenses, permits, and application systems could be standardized and streamlined for all mariculture activities.

3. A national vehicle for the timely dissemination of technological data, research results, & aquaculture technology should be provided for use by all levels of people engaged in this industry.

4. A public education program would provide a much wider market for all types of sea foods and put a lower cost high protein food source before the public.

After a careful review of H.R. 9370 we have found that it provides the vehicle allowing our above comments to be realized.

We wholeheartedly endorse H.R. 9370 both in spirit and word, as it addresses the sea as the Last Frontier, where our experience is at a minimum and our opportunities are the greatest.

Sincerely,

KURT D. VAN LAAR, *President.*
MICHAEL VAN LAAR, *Vice President.*

UNIVERSITY OF SOUTHERN CALIFORNIA,
INSTITUTE FOR MARINE AND COASTAL STUDIES,
Los Angeles, Calif., April 26, 1978.

DEAR MR. CHAIRMAN: I am pleased to have this opportunity to comment on your committee's hearings with respect to H.R. 9270, S. 2582 and S. 2762. During the past two years I have served as Chairman of the Committee on Aquaculture under the National Academy of Sciences' National Research Council. This committee was established to conduct a comprehensive study of the present state of aquaculture in the United States. The study entitled "Aquaculture in the United States—Constraints and Opportunities" was approved by the National Academy of Sciences in December 1977. It was published by the Academy in February of this year. I am particularly delighted that the Senate Committee on Agriculture, Nutrition and Forestry chose to publish the entire report as a committee print. This certainly will help to present our findings to a much broader constituency.

I will not attempt to make specific, section-by-section comment on the bills before your committee. This type of comment is well represented by those parties who are concerned with the daily practice of aquaculture activities. What I can offer as my 'specialty' are some views on how the government should address the question of supporting the advancement of this important field.

In the conduct of our study, the Aquaculture Committee approached the problem by simultaneously looking at the current state of U.S. aquaculture in 4 distinct areas: production systems; science and technology; economic and business; and law and public administration. We wanted to examine each of these areas concurrently to determine where problems could be identified that cut across the entire spectrum of activities. Solutions to those problems then would offer the greatest leverage to effect significant improvements.

It was interesting, though perhaps not surprising, that we quickly came to the conclusion the major obstacles and constraints were in the law and public administration area. To be sure, there were many problems identified in the other subject areas, but the solutions to many of them were dependent upon better government policies and programs in support of aquaculture. In other words, the scientific and technical questions were increasingly dependent for their solutions upon better government programs in this area. These government programs would require certain policies and procedures to be established which would support the overall advancement of aquaculture.

It is difficult to attempt to pick from our total study effort the key recommendation. I strongly recommend our entire report to the person seriously concerned with these issues. It represents our committee's tightest, most economic statement on a very complex set of questions.

Nevertheless, I believe the central issue of our study is the question of a federal lead agency for aquaculture. No such designated agency exists and therefore no

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one is really in charge of looking after the development of aquaculture policies and problems within the federal government.

Compared to agriculture or fisheries, aquaculture is a very small effort by any index of measurement you'd care to use. Yet if we agree that aquaculture offers important food options for the future then we basically imply an active governmental role in advancing this field. We need this to insure that we can move from the research laboratories into commercial practice. The 'end point' of the whole chain of development is effective food production as a viable business enterprise.

Thus early government involvement is vital to help shape national policies, provide assistance, support research and stimulate commercial development. But this cannot be done effectively with the present scheme of having three different departments of government (Commerce, Interior and Agriculture) working in this area with little coordination and with no one agency responsible for the lead function. As my committee noted in its report:

". . . a lead agency should:

"Develop, direct, and coordinate all U.S. aquaculture activities within the Federal Government;

"Represent and report on executive branch programs in this area to the President and Congress on a regular basis;

"Represent the United States in international matters relating to aquaculture;

"Recognize and enhance aquaculture programs in other relevant Federal agencies;

"Coordinate efforts directed at obtaining funds from Congress for aquaculture activities;

"Lead efforts at all levels of government to insure that aquaculture interests are adequately considered in the development of regulatory requirements for protection of the environment, public health, land use management, et cetera;

"Insure adequate long-range research and development in aquaculture which requires a level of funding that cannot be sustained by private business; and

"Insure that aquaculture enjoys parity of opportunity with related food production systems in terms of regulations, governmental support and insurance programs, and small business development programs."

In addition to the key question of the lead agency and its functions, we also considered the secondary question of which federal agency offers the optimum institutional characteristics to become the lead agency for aquaculture. It was the sense of the committee that the Department of Agriculture best met the need. The Food and Agriculture Act of 1977, passed prior to the completion of our report, seemed to point in this direction. Therefore we did not make this specific recommendation in our final report.

When the 1977 act appeared to give USDA the potential lead agency role, our concern then shifted to how well this agency might carry out this new responsibility. In other words, aquaculture now had a home in the federal government, but how good was that home? As a relatively new field, aquaculture is a minor element in the national food prduction picture. Also USDA had virtually no experience in saltwater aquatic problems. Therefore we felt it is incumbent upon this agency to recognize the special situation of scale and diversity of programs involved in this developing field if there is to be orderly growth. I personally believe that the present steps taken within the office of the Assistant Secretary of Agriculture for Conservation, Research and Education indicate an understanding of the special needs of aquaculture.

I recognize that there is considerable difference of opinion as to which government agency or agencies should have principal aquaculture responsibilities; whether or not there should be a lead agency, and if freshwater and saltwater aquaculture should be split into different program areas. My answer is simply that the end point of aquaculture is food production and we have a 'department of food' in our government, USDA. This is not a revolutionary concept, I note that many maritime states have fisheries and aquaculture under their 'Ministry of Agriculture'.

To insure a strong program, with orderly growth, someone has to be in charge. Interagency coordination is useful only if one of the parties has the responsibility for the final decisions and organization of the program to secure its support through the executive and legislative processes. Without the lead function mere interagency coordination is impotent and useless. While this option of only creating an interagency committee might offer a tidy political compromise between those wanting to do nothing and those pushing for a lead agency, it would

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gravely harm the chances of aquaculture to move out of its present mode of stagnated development.

My strong belief in the need for a lead agency, and that this agency should be USDA, does not in any way overlook or liable the excellent work that has been done for many years in both Commerce and Interior departments. Our committee report emphasized that the lead agency, whatever department of government designated, should recognize and work with the existing structure of excelelnt research conducted by NOAA's National Marine Fisheries Service and their National Sea Grant Program as well as Interior's U.S. Fish and Widlife Service. In addition to these major 'players', there are also numerous other federal agencies which have recognized aquaculture interests to a lesser degree. Thus we do not propose starting over in this field. We wish a consolidation and coordination of effort as the basis for the development of an institutional mechanism for the creation and implementation of national policy for aquaculture.

In short, I support and strongly urge the designation of a federal agency for aquaculture. Congressional action would help insure that this designation has the required permanency. I basically subscribe to the notion that some lead agency is better than none. However it is my considered belief that this agency should be the Department of Agriculture.

I appreciate having this opportunity to bring my views before your committee.

Sincerely,

DON WALSH, *Director.*

NATIONAL FISHERIES INSTITUTE, INC.,
Washington, D.C., May 12, 1978.

HON. HOWARD W. CANNON,
Chairman, Senate Commerce Committee, U.S. Senate, Cannon House Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: The National Fisheries Institute submits the following comments for insertion in the hearing record on the subject of aquaculture. The National Fisheries Institute is a trade association representing more than seven hundred member companies which harvest, process and distribute fish and seafood products in the United States and internationally. The Institute supports the adoption of aquaculture legislation which will coordinate the existing programs conducted by a multitude of federal agencies, express Congressional affirmation as to the need for this nation to develop its aquaculture potential and support that expression of interest with loan guarantees, insurance and disaster relief loans.

The Institute is of the opinion that proper management of our fish stocks within the fishery conservation zone, established under the Fishery Conservation and Management Act, will restore depleted traditional fisheries and provide an impetus for the development of underutilized fisheries. These actions will increase the amount of fish which can be harvested by the United States' fishing industry within the conservation zone. However, studies have indicated that United States demand for seafood products will increase by more than eighty percent by the year 2000, and other studies indicate that there may be a worldwide shortage of fishery products within three to ten years. If this nation is to supplement existing resources from within our fishery conservation zone and assist in meeting both the domestic and worldwide demand for seafood products, the increased development of our aquaculture potential is necessary.

At the present time, the U.S. aquaculture production is about 65,000 meric tons, as compared to Japanese aquaculture production in 1975 of 500,000 metric tons. This actual production is compared with an estimate that with proper management, U.S. aquaculture could reach one million metric tons by the year 2000. Certainly, the figures indicate hat the United States' aquaculture industry has a long way to go if it is to be of significant assistance in meeting the world's demand for fish protein.

While America's aquaculture production is not in line with the tonnage harvested by other countries, significant work on aquaculture has been funded by the National Oceanic and Atmospheric Administration and its predecessor federal agencies. Much of this work has been concentrated in salmon, trout, oysters, clams and shrimp. Much of this activity has been through the Sea Grant office and the National Marine Fisheries Service. In addition, NOAA last year announced a national aquaculture plan which provided for increasing the agency's aquaculture budget from $6.4 million to $19 million by 1979.

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In spite of this assistance by NOAA and assistance offered by other federal agencies such as the Department of Interior and Department of Agriculture, aquaculture development in the United States has not progressed dramatically in the past decade. The Institute believes that this was due to a number of factors including prior thinking as to the potential of our oceans, bays and rivers to supply the world with adequate supplies of fish, the lack of information regarding the nutritional values inherent in seafood products, the emphasis in this nation on traditional agriculture, water pollution and the lack of emphasis and coordinated activity among the federal agencies involved.

As the hearing record, both in the Senate and the House of Representatives, indicates there is now serious concern regarding the ability of the world's oceans to meet our demand for fish protein, more emphasis is now being placed on the nutritional value of seafood products, both in this nation and overseas. The Congress has paid more attention to the potential for protein from this nation's waters and increased emphasis is being placed on cleaning up the nation's waterways under the Clean Water Act. With the elimination of these limiting factors, one major limiting condition which still exists is the lack of coordination among federal agencies and resulting inadequate funding, information transfer and marketing assistance. In the Institute's opinion, this lack of coordination among federal agencies can best be solved by the enactment of legislation.

NFI supports, in principle, H.R. 9370 as passed by the House of Representatives, which establishes the Secretary of Commerce as the lead federal agency for the development of a national plan for aquaculture. The Institute observes that legislation has been introduced in the Senate which would designate the Department of Agriculture as the lead agency. We cannot support this proposal, as we believe that it is important that the federal agency most directly concerned with the development of this nation's fishery resources as a food source concurrently be designated as the lead agency for the development of an aquaculture program. There is no way to distinguish aquaculture from other forms of fisheries development, and we believe that the Department of Commerce has more than sufficient capabilities to administer this nation's fisheries program. At the same time, we recognize that other departments have played a lead role in the development of aquaculture programs for specific species. We believe such work should continue, and that H.R. 9370 provides an interagency committee on aquaculture for the express purpose of insuring that agencies carry out programs related to aquaculture under their respective jurisdictions.

At this time, Mr. Chairman, the Institute would like to express one caveat to its support of aquaculture, namely that Congressional action with regard to this topic must not result in a diminution of funding and support for essential development legislation for more traditional fisheries activities. The adoption of the Fishery Conservation and Management Act and resulting experience under that legislation strongly indicates the need for the enactment by Congress of fisheries development legislation which will provide a mandate to the Administration to accelerate its efforts in that area.

The Institute is aware that both your Committee and the Committee on Agriculture have held hearings with regard to pending aquaculture legislation. As we indicated above, we strongly believe that the Department of Commerce must be the lead federal agency for this and all phases of fisheries development. It would be regrettable if jurisdictional conflicts within the Congress, the Administration and the industry prevented the enactment of aquaculture legislation during the 95th Congress. We believe that the enactment of legislation similar to H.R. 9370, which designates Commerce as the lead federal agency with input from other concerned federal agencies and the administration by those agencies of their respective aquaculture programs, will be in the best interest of this nation.

Finally, the Administration appears to have concerns with funding levels for the various programs initiated under the pending legislation, and as always, much of this concern is within the Office of Management and Budget. As we indicated in our comments to OMB on the topic of reorganization, one of the reasons for the lack of strong Administration efforts presently and in the past with regard to this nation's fisheries has been the attitude adopted by OMB. The Institute recognizes the inflationary effects of significant deficits, but believes that a funding level can be arrived at which will meet these concerns, and at the same time, provide an adequate level of funding for this most important program.

Sincerely yours,

GUSTAVE FRITSCHIE, *Director, Government Relations.*

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STATEMENT OF HON. JAMES B. HUNT, JR., GOVERNOR, STATE OF NORTH CAROLINA

Mr. Chairman and members of the committee: I welcome this opportunity to present to this committee the position of the State of North Carolina on legislation to provide for the development of aquaculture in the United States—H.R. 9370, passed by the Huse; and S. 2582 and S. 2762.

We in North Carolina are very pleased to see this action on the part of Congress to bring together the presently scattered efforts of the Federal Government toward an efficient, coordinated National Aquaculture Development Plan and the means to implement that Plan and to provide the needed adequate stimulus for commercial aquaculture in the nation. We commend your efforts and look forward to their successful completion.

North Carolina has a long record of interest and action in aquaculture. We have been involved for many years in inland aquaculture with farm pond fish and with commercial catfish and trout production. Much of this development resulted directly or indirectly from the aquacultural expertise and actions of the Department of Agriculture and the Department of Interior.

We are pleased with these inland aquacultural developments and would like to see their expansion. However, a great concern presently is with aquaculture in marine and brackish waters. It is generally conceded that our traditional marine capture fisheries are being exploited at or near the capacity of the stocks. Thus, there remains little opportunity for significant expansion of North Carolina's seafood production and for much needed coastal industrial growth from the harvest of wild stocks. For this reason, it has been established state policy and is a primary goal of my administration to advance the development of commercial marine aquaculture in this state.

Oyster culture has a long history of research, development and commercial application in North Carolina. The Division of Marine Fisheries has carried out a large-scale program of rehabilitating oyster bottoms for many years. Our State Sea Grant program carries out an advisory program for commercial growing of oysters in trays in natural waters and for predator control.

Two commercial enterprises in North Carolina produce seed clams for planting in natural waters or closed systems. Several independent fishermen are now growing clams on leased bottoms on the Outer Banks.

Our greatest aquacultural success story to date has been with eel culture. There exists a ready, high value market for eels in overseas areas, particularly in Japan. Feasibility studies and an experimental operation through our Sea Grant program have shown that the larval eels (elvers) can be economically reared to marketable size and that a uniform, superior product can be obtained. Studies on nutritional needs and facility development are underway.

Other species with recognized potential for marine aquacultural development in North Carolina include: dolphin, American lobster, striped bass, seaweeds and algae, bay scallop, blue mussel, and yellow perch.

North Carolina's extensive estuarine and shoreline systems are prime sites for various forms of marine aquaculture. However, there are considerable needs for biological and engineering research before economical feasibility of many of them can be adequately assessed. In cases where we believe the level of knowledge and technology to be approaching the take-off point for commercial development, potential aquaculturalists cannot find the capital support to allow their entry into a new, risky industry.

For these reasons, North Carolina finds the aquaculture development bills now under discussion by Congress to be extremely timely, pertinent and needed. We agree in general with their goals, content and language. However, in view of certain significant differences between the three separate bills under consideration, and given the experience and the on-th-spot observations of this coastal state in the proces of attempting to advance commercial aquaculture within its own boundaries, I would like to offer the following specific recommendations of the State of North Carolina.

A. *Lead Agency.*—We recommend that the Department of Commerce be the lead agency for the development of the National Aquaculture Devlopment Plan. Aquacultural development of the future will, essentially, be marine aquaculture. The Department of Commerce, through its agency NOAA, has the expertise and the capacity for most effectively carrying out this charge.

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On the other hand, we recognize and highly value the importance of the Department of Agriculture and Department of the Interior in the development to date of aquaculture, particularly inland aquaculture. Therefore we recommend that the approach of H.R. 9370 and S. 2762, calling for Commerce as the lead agency but working in consultation with Agriculture and Interior be adopted. We do not concur with S. 2582 that Commerce alone should have responsibility for the Plan. Further, we do not agree with the Department of Agriculture's statement that Agriculture should be the lead agency.

B. *Regional input.*—North Carolina strongly recommends the requirement of S. 2762 calling for the lead agency to establish an advisory committee for the purpose of assisting in formulating a plan responsive to the various regional needs, interests and approaches to the concept of aquaculture. The concept of this advisory committee being composed of (in part) regional divisions created under the Fishery Conservation and Management Act of 1976, and the specification of broad representation within each division, goes a long way toward insuring a workable Plan. The environmental, social and geographic differences among the coastal regions of the United States and territories are too vast and too significant to allow for any but a regional approach to aquacultural planning.

C. *Support of private enterprise.*—Ultimately, the success of aquaculture depends upon its viability as private enterprise. It must prove itself profitable. However, almost any aquaculture enterprise is an extremely risky business undertaking, and therefore the entrepeneur finds it difficult to locate adequate risk capital or to insure himself adequately against the many hazards of loss in aquaculture. Therefore, North Carolina heartily recommends the approach of all three bills in providing economic incentives to private aquaculturalists in the form of loan guarantees, disaster loans and insurance. Recognizing that most significant aquacultural enterprises must be large scale and involve large capital investments over long periods of time, often with long delays before profits are realized, such loan guarantees and insurance incentives must be sizeable. Further, the take-off rate of commercial aquaculture should not be retarded by insufficient moneys to cover the needs of all appropriate new enterprises. Therefore, we recommend that the wider coverage and larger dollar authorizations presented in H.R. 9370 and S. 2762 be adopted, instead of the more conservative coverage and authorizations of S. 2582.

Thank you very much for giving me this opportunity to present the views of North Carolina on this important topic of national aquaculture development.

Statement of Dr. Ronald O. Skoog, Commissioner, Department of Fish and Game, State of Alaska

Potential for Aquaculture in Alaska

Alaska, of all the States, is unique because of its tremendous size, not only in land mass, but in coast line. She is adjacent to extremely productive estuarine and marine environments such as the Gulf of Alaska, the Bering Sea, and the Arctic Ocean. Millions of metric tons of a variety of species are harvested annually in those waters by United States fishermen as well as foreign fleets. With the 200 mile extension a new dimension has been created that will have a major impact on the fishermen of Alaska as well as other States.

Alaska is also unique because she possesses vast freshwater resources that in some instance are highly productive, such as the major cyclical red salmon producing lakes adjacent to Bristol Bay, but in other instances some of her freshwater environments are relatively nonproductive. Low levels of productivity in the freshwater environments may be attributable to many causes, such as the lack of basic nutrients, the influence of rapidly discharging glaciers, extreme fluctuations in temperatures, dissolved oxygen and water flows, and absence of established fish populations.

From Barter Island in the northeast Arctic westward and southward to the north side of the Alaska peninsula, with but few exceptions, Alaska's coastline is exposed directly to high winds and seas and low winter temperatures. Es-

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tablishment of estuarine and marine Aquaculture facilities in this region could be costly. However, major productive but unutilized freshwater resources are available for increasing the production of salmon, trout, char, whitefish, grayling, and sheefish. Those species have evolved and are adapted to harsh Arctic and sub-Arctic environments. Therefore effective Aquaculture development in that region of the State must be tailored toward utilizing these freshwater environments in conjunction with species naturally associated with those environments.

Within an arc beginning on the south side of the Alaska peninsula, curving northward to Cook Inlet, and then southerly to the borders of British Columbia are many fjords protected from wind and wave that are suitable for the establishment of estuarine and marine Aquaculture facilities. Furthermore, a myriad of rivers and streams discharge into those fjords thus providing the opportunity for the development of multiple species as well as multiple environment facilities. Unfortunately, with the exception of salmon and trout, little research effort by either the State or Federal Government has been directed toward the development of Aquaculture technology required for other indigenous species, and especially for the invertebrates such as clams, scallops, abalone, and sea cucumbers. Undoubtedly, lack of that type of basic research has been a function of market demands, funds, and priorities.

With that brief broad background of the potential for Aquaculture in Alaska I will direct my testimony briefly to the present status of Aquaculture in Alaska.

STATUS OF AQUACULTURE

With passage of the Statehood Act the people of Alaska assumed management control over complex freshwater, estuarine and marine ecosystems in which a variety of valuable commercial, sport, and subsistence species dwelt. In some instances, specific stocks of crab, shrimp, trout, char, whitefish, steelhead, grayling, sheefish, and salmon had not been over utilized.

In other instances, particualrly in the case of salmon, many stocks had been decimated by over-utilization. Consequently, following statehood, and continuing since, extremely restrictive regulations have been passed, when deemed necessary, in an effort to rebuilt or rehabilitate decimated natural salmon stocks. Unfortunately many natural stocks could not recover in a timely manner through the mechanics of either restricted harvest or the total absence of harvest.

Recognizing that problem, coupled with the knowledge that Alaska also possessed a tremendous potential for enhancement of the salmon resource and also was faced with a rapid acceleration of trout and salmon sport effort. the 1971 legislature, with concurrence of the Governor, created a special division—the division of fisheries rehabilitation, enhancement, and development—within the department of fish and game to tackle Aquaculture problems. The division was removed from the regulation aspects of harvest (a major departmental effort) so that the division could concentrate on developing and applying rehabilitation and enhancement technology. Specific statutory obligations were enacted and are as follows:

Sec. 16.05.090. Organization of the department.

(A) The commissioner may, with the approval of the Governor, establish a departmental division of commercial fisheries, a departmental division of sport fisheries, a departmental division of game, and other departmental divisions as are necessary.

(B) The commissioner shall establish a departmental division of fisheries rehabilitation, enhancement and development (15, art. I, ch. 94, SLA, 1959; am. 1, ch. 113, SLA, 1971).

Sec. 16.05. 092. Duties of division of fisheries rehabilitation, enhancement and development. The division of fisheries rehabilitation, enhancement and development shall:

(1) Develop and continually maintain a comprehensive coordinated State plan for the orderly present and long-range rehabilitation, enhancement and development of all aspects of the State's fisheries for the perpetual use, benefit and enjoyment of all citizens and revise and update this plan annually.

(2) Encourage investment by private enterprise in the technological development and economic utilization of the fisheries resources;

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(3) Through rehabilitation, enhancement and development programs do all things necessary to insure perpetual and increasing production and use of the food resources of Alaska waters and continental shelf areas;

(4) Make a comprehensive annual report to the legislature, containing detailed information regarding its accomplishments under this section and proposals of plans and activities for the next fiscal year, not later than 20 days after the convening of each regular session. (2, ch. 118 SLA, 1971.)

In 1974, recognizing that the fishermen should become directly involved in the rehabilitation and enhancement effort, the legislature passed the private non-profit Hatchery Loan Act. By amendment in 1977 of the 1974 act, regional planning teams could be established throughout the State. Regional planning teams are comprised of department personnel and members of regional fishermen's associations. Regional fisheries associations consist of a cross-section of user groups including commercial, sport, and other interested users.

Regional planning teams are charged with developing and recommending to the commissioner of fish and game a comprehensive regional plan for the rehabilitation and enhancement of the salmon resource. Four regional planning teams presently are functioning in the State: two in southeastern Alaska, one in Prince William Sound, and one in Cook Inlet. (I have four copies of a recently drafted procedures manual that I will leave for your review.)

Concurrent to those developments, the capabilities of the division of fisheries rehabilitation, enhancement and development (FRED) were expanded to include pathology, genetics, and engineering as well as fish culture and biology. A modern fish pathology laboratory has been constructed in Anchorage with full diagnostic capabilities. A regional pathology laboratory was opened recently in Juneau. The Juneau pathology laboratory also serves as the genetics laboratory for statewide work.

State regulations and policies have been established that prohibit movement of all life-history stages of fish and wildlife into, within, or out of the State unless approved by the commissioner. Inspection for disease is mandatory prior to any transport.

Since 1971, over 50 million dollars have been appropriated to the FRED division for the construction of multi-species hatcheries and fish passes, habitat improvement, research, and disease prevention research and control.

The State of Alaska's long-range salmon plan calls for achieving an average annual harvest of a hundred million salmon. It is doubtful that that level of harvest may be achieved without assistance from the Federal Government. Benefits from the State's program are shared with nonresidents. In addition, the private nonprofit Hatchery Loan Act established a 200 million dollar revolving loan fund. Salmon produced by that loan fund will yield benefits to residents and nonresidents.

Thus, Mr. Chairman, since 1971, the State of Alaska has actually established through its major commitment to the salmon resources the framework for a rational approach to all Aquaculture within the State that could easily dovetail with Senate bill 2762.

I can make that statement because:

Planning teams are already being established consisting of users and resource managers. Financial assistance expansion to species other than salmon is a minor transition.

Matching monies will be or are available in the public as well as the private nonprofit sector as evidenced by the loan program and catch assessment program.

Existing Alaska statutes permit the development of Aquaculture.

A special fisheries division has already been created to carryout such a program and is staffed by all prerequisite disciplines.

PROBLEMS ASSOCIATED WITH AQUACULTURE DEVELOPMENT IN ALASKA

First, the State does possess many valuable natural stocks of a variety of species. Thus Aquaculture should be integrated into the existing ecosytems without damage to valuable natural stocks. As long as the State maintains control over the management of her natural fish populations and is able to integrate the development and application of Aquaculture technology into the natural producing ecosystems regardless of land ownership, we are confident that natural stocks will be adequately protected. If other land owners assume

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control for management of aquatic resources within their boundaries, we cannot guarantee protection of wild stocks that may pass through non-State-controlled ecosystems.

With the diverse Federal and private land and water ownership patterns evolving in the State as a result of actions under the Alaska Native Claims Settlement Act, such as the proposed "D–2" legislation, it is difficult to envision a rational approach to Aquaculture in Alaska unless one agency is responsible for the development and final administration of a plan. The State of Alaska, in partnership with the Federal Government, is in the best position to develop that plan as well as control its application. That partnership should not abrogate the State's right to manage her fisheries resources but should reflect the Federal Government's responsibility to assist the State when it is in the best interests of the people of the United States. Since many nonresident commercial and sport fishermen fish the waters of the State, the Federal Government has an obligation to supplement State efforts not control.

Alaska is the last State in the Union to possess vast acreages of public-owned unexploited terrestrial and aquatic ecosystems. Many of those public-owned aquatic ecosystems are highly productive, others are not. Many potential Aquaculture sites lie within Federal lands, whether it be hatchery or fish-ladder sites or underutilized lake systems. We have attempted to identify many of those potentials in our testimony regarding proposed "D–2" legislation. Many potential estuarine and marine Aquaculture sites may lie within boundaries now being established by Congress. Without specific knowledge these sites are difficult to identify, but the boundaries are being drawn anyway. We believe Aquaculture is a very real part of multiple use. It is imperative that those wilderness, refuge, and park areas now under consideration by Congress will not preclude a rational approach to Aquaculture in the future.

One of the major problems that we face is lack of knowledge regarding potential Aquaculture sites, whether it be freshwater, estuarine, or marine. Furthermore, much baseline data must be collected if Aquaculture is to be integrated with natural-stock management. Development of Aquaculture at the expense of natural stocks is irresponsible, both economically and ecologically.

Another major problem that we have as resource managers in Alaska results from cold water temperatures and highly seasonal food availability. Many of our valuable nonanadromous sport species are very slow growing and exhibit older maturity schedules than observed in the lower 48. Thus, if effort increases substantially in the State because of an influx of sport anglers, many trophy native stocks could be harvested quickly and impacted adversely. We have observed this problem adjacent to major population centers in Alaska. Thus, the creation and advertising of refuges, parks, and wilderness areas, with the attendant increased interest in Alaska angling, could have a significant detrimental impact on presently unexploited fish populations.

Sound planning based upon carefully developed harvest strategies derived from reliable investigations is essential, or old-aged trophy-fish areas could disappear rapidly. Without careful planning and prerequisite data, put-and-take fisheries will be demanded. Obviously, Aquaculture planning must consider the needs of trophy anglers as well as the less esthetically inclined anglers. Trophy areas should not be opened up to high rates of exploitation or altered by superimposition of high production Aquaculture systems.

SPECIFIC COMMENTS ON AQUACULTURE BILLS NOW BEFORE THE SUBCOMMITTEE

Mr. Chairman, we have reviewed carefully aquaculture bills H.R. 9370, S. 1043, S. 2582, and S. 2762. There are basic similarities in all those bills, but we feel S. 2762 most nearly coincides with our views of development of Aquaculture in Alaska because of:

(1) The tremendous range of environmental conditions in Alaska;

(2) Our knowledge of the diversity of user groups' needs, resident and nonresident alike;

(3) The State's managerial authority and responsibility for maintaining and developing the aquatic resources;

(4) The knowledge that residents and State agencies possess regarding the State's wide-ranging environmental conditions and complex harvest problems;

(5) The initial establishment of a coordinated public-resource manager planning system;

(6) The diverse State-Federal-private land ownership which encompasses potential aquaculture sites; and

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(7) Recognition by the State of national interests.

Therefore, my testimony as commissioner of the Alaska Department of Fish and Game is directed toward specific changes in S. 2762 that will yield the best Aquaculture plan for Alaskan ecosystems. That plan must be derived initially from data sources and from public and private needs as close to the resource as possible. Thus the State and her people should take the lead in establishing priority species, data-base needs, policy guidelines, and regulations that will produce and implement an acceptable plan.

Mr. Chairman, as pointed out earlier, my department is developing a very close working relationship with Alaskan Aquaculture associations. We have carefully reviewed comment on S. 2762 transmitted in a letter of March 31 to Senator Gravel from Mr. A. W. Hall, business manager of the Prince William Sound Aquaculture Corporation. We endorsed those comments. We also have reviewed a letter of April 6, 1978, transmitted to Senator Gravel from Dr. Derek Poon, general manager of the Northern Southeast Regional Aquaculture Association, and we endorse those comments on S. 2762 also. I will leave a copy of these two letters for the committee's perusal and for the record.

In addition to those departmentally endorsed comments, I offer the following for your consideration:

Under "Sec. 4. National aquaculture development plan (a)(2)(C) membership of regional advisory subcommittees * * *" we suggest the addition of fish processors to the list of representatives.

Under "Sec. 5. Functions and powers (a)(3)" we do not believe, Mr. Chairman, that it is in the best interests of the resources of Alaska for the Secretary to produce and sell seed stock without State control. The State needs control over the sale and movement of seed stock into, within, or out of the State in order to carry out its management responsibilities for protecting natural stocks and for maintaining disease and genetic control. We consider this authority as being absolutely necessary because of the present lack of Federal controls in this area of concern.

Under "Sec. 5.(a)(4)" because Alaska has such a complex land ownership problem, and because anadromous stocks of salmon, trout, sheefish, and char may pass through several land owners, we believe it is to the best interests of the resources of Alaska that Federal encouragement for the implementation of rehabilitation and enhancement technology be given only after approval by State regulatory agencies. Without addition of that language it would be possible for a Federal agency to encourage the construction of a hatchery or other facilities that may have a negative impact on significant natural stocks passing through the same waters.

Under "Sec. 5(a)(5)" we suggest the elimination of the words "in areas where multiple land and water uses exist" and the substitution of the words "on all Federal areas, notwithstanding present laws to the contrary, Aquaculture * * *" Alaska's fisheries are of such tremendous value to the State and to the Nation as a whole that we cannot afford to preclude fishery enhancement work on all of the relatively few acceptable sites in Alaska simply because of present classifications, e.g. "wilderness" or "wildlife refuge."

Under "Sec. 5.(b)(1)(A)" we believe it is to the best interests of the State's fishery management program that research and development facilities be permitted only after consultation and approval by the State's regulatory agencies. Addition of that language, Mr. Chairman, will help to prevent needless duplication of efforts and agencies working at cross purposes.

Thank you for the opportunity to present this department's views. My staff and I will be available for consultation as might be necessary during the committee's deliberations. Please let me know if you wish our help at any time.

PRINCE WILLIAM SOUND AQUACULTURE CORP.,
Cordova, Alaska, March 31, 1978.

Hon. MIKE GRAVEL,
U.S. Senate, Washington, D.C.

DEAR SENATOR GRAVEL: I recently received from your office a copy of your aquaculture bill, S-2762, and I am enclosing my comments for your consideration.

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We in the Prince William Sound Aquaculture Corporation are very appreciative of your efforts in regard to this subject which is of such great importance to Alaska. We have enjoyed working with your aid, Mr. Tom Roach and we commend his work on this bill.

I have restricted the majority of my comments to the subject of the National Aquaculture Development Plan and the development programs that it calls for. My primary concern in this regard is the role of the states in relation to the role of the federal government in the plan and development program formulation. I am very concerned that the present wording of the bill will result in a federal domination of these activities because too much responsibility and authority is given to the Secretary of Commerce. My recommendations to correct this situation are as follows:

1. Assign to the regional subcommittees the responsibility for identification of priority species and for the formulation of their development programs.
2. Limit the Secretary's role in regard to the development programs to one of reviewing, approving and implementing.
3. Require the Secretary to consult with the appropriate regional subcommittee prior to revising or cancelling any program.
4. Provide funding for the regional subcommittees to carry out their planning activities.

I am very pleased to see the attention that you have given to the rehabilitation and enhancement of publicly owned fish and shellfish resources. Your bill corrects the deficiencies of similar bills in this regard by identifying this subject as one of vital concern to all states with publicly owned fishery resources. Do you think that this concern might be given more funding attention in the bill? A matching federal, state and local grant program would stimulate greater efforts in these areas, and would most certainly benefit Alaska.

I have not addressed myself to the sections of the bill that deal with Contracts and Grants (section 7), Guarantees of Obligations Issued for Aquaculture Facilities (section 8), Disaster Loans (section 9), or Insurance Against Certain Losses Incurred in Aquaculture Facility Operations (section 10), because of the limitations of my expertise in these areas.

In closing, I would like to emphasize the position of my organization that Mr. Leggett's bill, H.R. 9370, as presently written is not good for Alaska. Your bill S-2762, is a great improvement on that bill and, with the additions of our recommended amendments in regards to the role and responsibilities of the regional subcommittees, will be good not only for Alaska, but for the other 49 states as well.

Sincerely yours,

A. W. HALL,
Business Manager.

PRINCE WILLIAM SOUND AQUACULTURE CORPORATION COMMENTS AND RECOMMENDATIONS TO S-2762

(By Senator Mike Gravel)

SECTION 4, NATIONAL AQUACULTURE DEVELOPMENT PLAN

1. Page 8, Line 5—insert after the word "shall" the following: "have", and add a "d" to "prepare".
2. Page 8, Line 9—"consisting of the chairmen of the subcommittees created under subsection (a)(12)(B) of this section,".
3. Page 9, Line 19—insert new subsection "E" renumber following subsections.

"(E) The regional subcommittees shall formulate regional aquaculture development programs for each priority species and submit them to the Secretary for his review and approval".

4. "(G) The Secretary shall provide funding for each regional advisory committee established under sub-paragraph (B) sufficient to support the activities required by this act.
5. Page 10, Line 8—rewrite line to read: "* * * which the regional subcommittees determine to have a potential for * * *".

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6. Page 10, Line 10—strike the wording "the Secretary" and insert in lieu thereof "them".
7. Page 11, Line 1—rewrite line to read: "(2) contain regional aquaculture development programs, * * *".
8. Page 11, Line 2—strike the word "Secretary" and insert in lieu thereof "Regional Subcommittees"
9. Page 11, Line 4—insert the word "regional" between "the" and "aquaculture", and add an "s" to "program".
10. Page 11, Line 5—strike the words "set forth" and insert in lieu thereof "be reviewed".
11. Page 11, Line 6—rewrite line to read: "* * * and approved by the Secretary after he determines those actions which should be * * *".
12. Page 11, Line 7—insert after the word "undertaken", the following: "to implement the regional plans,".
13. Page 12, Line 5—add the following language immediately after the word "areas;" "* * * and the populations of fish and shellfish native to the areas".
14. Page 12, Line 17—strike the words "In preparing" and insert in lieu thereof "prior to approving".
15. Page 12, Line 19—rewrite line to read: "* * * such programs pursuant to subsections (c) and (f), the Secretary * * *".
16. Page 13, Line 18—rewrite line to read: "* * * propriate Regional Fishery Management Council, the appropriate regional subcommittee created under section 4(a)(2)(B), and any * * *".
17. Page 14, Line 8—insert between the words "and" and "prepare", the following: "direct the appropriate regional subcommittee to * * *".
18. Page 14, Line 11—insert between the words "Secretary" and "funds" the following: "after consultation with the appropriate regional subcommittee".

SECTION 7, CONTRACTS AND GRANTS

1. Page 21, Line 6—replace "(a)" with "(a)(1)".
2. Page 21, Line 15—insert new paragraph to read: "(2) The Secretary, together with the Secretary of Interior and the Secretary of Agriculture shall establish a matching grant program requiring federal and state or local government participation for the purpose of the rehabilitation and enhancement of publicly owned fish and shellfish resources".

SECTION 8, GUARANTEES OF OBLIGATIONS ISSUED FOR AQUACULTURE FACILITIES

1. Page 25, Line 5—insert between the words "fewer" and "employees" the following: "full time".

SECTION 11, FEDERAL AQUACULTURE ASSISTANCE FUND

1. Page 44, Line 5—insert between "sections" and "8", the following: "4,".
2. Page 44, Line 21—insert between "sections" and "8", the following: "4,".
3. Page 44, Line 25—insert between "sections" and "8", the following: "4,".

SECTION 13, AUTHORIZATION OF APPROPRIATIONS

1. Page 47, Line 19—insert between "sections" and "8", the following: "4,".

NORTHERN SOUTHEAST REGIONAL AQUACULTURE ASSOCIATION, INC.,
Sitka, Alaska, April 6, 1978.

Hon. MIKE GRAVEL,
U.S. Senate,
Washington, D.C.

DEAR SENATOR GRAVEL: After reviewing the "National Aquaculture Organic Act of 1978", S-2762 received from your office, I have the following comments for your consideration.

Your aide, Mr. Tom Roach, contacted me last fall at which time we briefly discussed national aquaculture legislation and the possibility of your action. Since that time, Mr. Roach has kept me informed, and I have followed the

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progress of the legislation with interest. Your efforts to improve the legislation which passed the House are greatly appreciated. Your bill will be much better for Alaska and our fishermen than the House bill.

I have discussed the bill with Mr. Bill Hall of the Prince William Sound Aquaculture Corporation, and I have read his comments and recommendations. I am supportive of Mr. Hall's comments and recommendations for amending the bill.

Additionally, I would like to add some comments.

(1) I am especially supportive of the regional subcommittee concept in your bill and believe funding and any other support to maximize its effectiveness should be promoted. By developing the plan close to the people, the end product will reflect their interests, experience and expertise. I know that in Southeast Alaska the Forest Service and the National Marine Fisheries Service have personnel very knowledgeable about the potential for aquaculture development. Hopefully, these people, state biologists and local fishermen will be able to either serve on a regional subcommittee or provide input directly to the subcommittee.

(2) The NSRAA Board of Directors has taken a strong position in favor of rehabilitation of natural salmon stocks. The preferred emphasis is on cost-effective projects which complement and enhance rather than conflict with or replace natural production. A matching federal, state or local grant program to stimulate the efforts of fishermen and other groups to this area would greatly benefit Alaska.

(3) I am requesting, in a separate letter, that your Juneau office send copies of your comments in the Congressional Record prefacing introduction of S–2762 to each NSRAA Board member to keep them informed of developments on the national legislation. You may receive some additional comments from them.

Enclosed are copies of our latest informational brochures which were sent to fishermen explaining our program. These materials may give you some ideas on how to coordinate our plans with the national aquaculture plan and possibilities for our Association to work in partnership with the federal and state governments through a combination of grants, loans and insurance to enhance our fisheries.

Finally, I would like to restate my support for your bill S–2762, and the proposed changes recommended by Mr. Bill Hall. S–2762, especially with the suggested changes, will benefit Alaska more than Mr. Leggett's bill H.R. 9370.

Thank you for keeping us informed.

Sincerely,

DEREK POON, Ph. D.,
General Manager.

STATEMENT OF BARRY B. WHITE, CHAIRMAN, AQUATEC INTERNATIONAL, INC., GUILFORD, CONN.

Mr. Chairman, members of the committee: I should like to address my remarks to four (4) provisions in the Senate Bills (S. 2582 and S. 2762) that differ significantly in content and impact from the House Bill (H.R. 9370) as passed.

The first of these provisions is the designation of the Department of Commerce as the sole lead agency for Federally sponsored or directed aquaculture development in the United States. The duplication and lack of coordination among Federal agencies must end if the Federal Government is to truly assist the aquaculture industry to develop its potential to provide a reasonably priced, high protein food for the U.S. consumer, to assist in reducing our balance of payments by reducing our reliance on imported fishery products, and to reduce the pressure on our wild stock fisheries. At the present time, eleven Federal agencies have a direct involvement with aquaculture with some ten other agencies having programs that are indirectly related. The important consideration here is, what agency currently has the expertise and structure to provide the strong leadership necessary *now*. It is obvious that, after a close scrutiny of the agencies now involved in aquaculture programs, that only the Department of Commerce, through the National Marine Fisheries Service and the Office of Sea Grant, has the expertise and the potential for leadership.

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The Department of Agriculture could, and undoubtedly would, continue operating in some areas of freshwater fish farming through their farm extension agents, especially in the area of catfish farming, as an adjunct to traditional agriculture endeavors. The Department of Interior will also continue to have an interest in aquaculture development especially as it relates to development and use of Federally owned land.

The interest of these agencies, plus those other Departments and groups with subsidiary interests, can maintain that interest and provide meaningful input through membership on the Interagency Committee on Aquaculture, to be established under the Bill.

A second major difference between the House Bill (H.R. 9370) and S. 2582 and S. 2762 is the level of guaranteed loan obligation which is reduced from $500 million to $100 million in the Senate Bills. We feel that this lower level is a more realistic level and that it more truly represents the funds required for development over the next decade given the present state of the arts and requirements for the industry. We feel this level of guarantee will provide the necessary capital to proceed with commercial production now and will further assist the industry in providing the data necessary to the private sector for expansion funds in the future without the necessity of further Federal guarantees. Further, it would seem logical to assume that the agency could review the guarantee program at the end of three to five years to determine its viability and could, if indicated, request from Congress a greater level of guarantee obligation.

The other two points of difference between the House and Senate Bills are in the areas of disaster losses and all-risk insurance. It is our understanding that disaster loan funds for aquaculture facilities will be available under the Federal Disaster Loan Act and that provision for disaster assistance in the aquaculture Bill would be a duplication of effort.

Regarding the all-risk insurance provisions of the House Bill (H.R. 9370), we feel that the basic insurance required of any business is available from the private sector.

This insurance covers such items as fire, theft, compensation, etc. However, in isolated cases, the private sector insurance industry will not as yet cover specie lost due to disease, equipment failure, theft, etc. Until such time as the aquaculture industry provides a "track record" on which the insurance industry can base rates, it will be of immeasurable assistance for the Federal Government to assume this obligation.

We strongly support the Bill as a whole, especially the grant provisions for research and development. We urge prompt action by the Committee and the Senate as a whole. As you are fully aware, if the Senate fails to take affirmative action this session, it will be necessary to reintroduce Bills in both Houses next session with resulting delays and increased costs.

STATEMENT OF JOHN C. DATT, DIRECTOR, WASHINGTON OFFICE, AMERICAN FARM BUREAU FEDERATION

We appreciate the opportunity to express our views with regard to legislation to establish a program to promote the development of aquaculture.

Farm Bureau is the nation's largest general farm organization, representing more than 2.8 million families who are voluntary, dues-paying members in more than 2,800 county Farm Bureaus in 49 states and Puerto Rico. Farm Bureau members are engaged in the production and marketing of every major commodity, including the farm production of fish both for human consumption and for other purposes.

At the most recent annual meeting of the American Farm Bureau Federation, the voting delegates of the member State Farm Bureaus adopted the following statement on "Fish Farming":

"Fish farming is an agricultural enterprise and should be treated as such. We will oppose any proposal that would unreasonably impede the movement of farm-produced fish to market."

We commend this Committee for its interest in legislation to promote the development of aquaculture in the United States. The issue to be resolved is whether this program should be administered by the Department of Agriculture or the Department of Commerce.

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We believe that the interests of producers and consumers would be best served if authority for programs having to do with the production, marketing, and regulation of farm-produced fish were to be placed in the United States Department of Agriculture. Such action would be consistent with Section 1502(b) of the Food and Agriculture Act of 1977, which amended the USDA's Organic Act to include aquaculture "among the basic functions of the Department of Agriculture." USDA—through the Agricultural Experiment Stations, the Cooperative Extension Service, and the Soil Conservation Service, to name a few agencies—has had many years of successful experience with programs to improve the production and marketing of live animals and poultry.

We appreciate the opportunity to present Farm Bureau's views with respect to the development of aquaculture.

STATEMENT OF KENT S. PRICE, JR., ASSOCIATE DEAN AND ASSOCIATE PROFESSOR, COLLEGE OF MARINE STUDIES, UNIVERSITY OF DELAWARE, LEWES AND NEWARK, DEL.

Mr. Chairman and committee members, my name is Kent S. Price, Jr., and I am Associate Dean and Associate Professor of the College of Marine Studies and Associte Sea Grant Director at the University of Delaware. I also recently had the privilege of acting as rapporteur for the Committee on Aquaculture of the National Academy of Sciences. I understand that the report of that committee was reprinted for use by your committee. Finally, my professional qualifications include ten years of experience in research and research management at the University of Delaware directed toward the development of controlled environment (recirculated) systems for growing commercially valuable filter feeding bivalve shellfish.

As you might expect, I agree with most of the findings and recommendations of the National Academy of Sciences Committee of Aquaculture since I participated directly in the study. However, rather than speaking to you as a member of the Aquaculture Committee, I am here today to present my views as a staff member at the University of Delaware which is both a Land Grant and Sea Grant College.

BACKGROUND

The University of Delaware initiated mariculture research ten years ago due to a severe decline in the oyster industry of Delaware Bay (Fig. 1). Although the collapse of this seafood industry appeared to be a local problem, it has since become apparent that many natural fisheries are declining (See Fig. 1 for trend of oyster production in Chesapeake Bay) due to overfishing, pollution, disease, and natural events. Further analysis of the situation shows that we are just now crossing the frontier from hunting and collecting marine species for man's use to properly managing and husbanding them for uses equivalent to those seen in terrestrial food and fiber production. In agriculture, man began to cross that frontier several thousands of years ago. For sometime, knowledgeable people have been asking why the development of aquaculture has not kept pace with the development of agriculture in this country. The question was recently addressed by the Committee on Aquaculture of the National Academy of Sciences as mentioned earlier.

I won't repeat the Committee's findings because you have them before you. I can, however, amplify them particularly along the lines of the University of Delaware's experience.

In 1968, shortly after the establishment of the National Sea Grant Program, the University of Delaware began research supported by Sea Grant to revitalize the shellfish industry in Delaware. Research centered on shellfish diseases, controlled reproduction, predators, water quality and food for the animals. After two years of research it became apparent to us that a new approach was needed. Natural water quality was highly variable and subject to human and industrial contamination. Harvest times were seasonal and animal quality was not uniform.

As a result of these problems in nature, our Sea Grant research was redirected in 1971 to the development of commercial methods to grow shellfish in a fully controlled environment. The advantages we foresaw in using a closed

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system or controlled environment approach included: (1) spawning on command to insure year around production, (2) growth at increased rates due to optimum diet and feeding rates, (3) uniformity of product, (4) certification of disease-free product, and (5) recycling of materials, and conserving energy. Table 1 elaborates further a comparison of closed (recirculated) and open systems, while Fig. 2 depicts a closed system.

Thus far our expectations have been borne out by solid progress in research. As you know, in nature, oysters and clams grow to three-inch market size in three to five years. Our research has shown that this long growing period is due principally to an inadequate food supply. We have perfected methods to grow algae monocultures which can be blended to provide shellfish with optimally nutritious diets for animals of various ages. Most important, though not surprising, our research showed that most shellfish growing in natural waters were almost always undernourished and that if adequate quantities of the proper types of food were made available then growth rates could be accelerated to produce marketable animals in roughly one quarter the time required in nature. In our laboratory we now raise small quantities of oysters to three-inch market size and clams to "little neck" market size in just nine months (Fig. 3).

ADVANCES IN CLOSED (RECIRCULATED) SYSTEM MARICULTURE

Major recent advances include: (1) harnessing the growth of nutritious algae by controlling the availability of plant nutrients, carbon dioxide, light and appropriate pH to produce cell densities of over 10 billion per liter or about 1000 times the densities found in nature. Algae grown in controlled reactors are capable of photosynthetically capturing about 4.0 percent of the sun's energy which reaches the earth. By comparison the best producing corn crop captures about 3.3 percent of the sun's energy, (2) definition of the components of a recirculating system and the ranges of temperature, water quality, and nutritive constituents necessary for continuous system operation, (3) preparation of a design for a 200 bushel per year shellfish culture prototype for determining the economic viability of recirculated system mariculture, and (4) the process is now being patented so that commercial investors can be protected by licenses.

Mariculture research at the College of Marine Studies is now in its ninth year. It has progressed steadily from the establishment of a modest oyster hatching effort to a highly integrated scheme for the controlled environment cultivation of algae and shellfish in recirculating seawater (Fig. 2). The present program embraces work on the intensive cultivation of oysters (*Crassostrea virginica*, the American east coast oyster), clams (*Mercenaria mercenaria*, the east coast hard clam), and single celled marine algae, principally diatoms and flagellates. This work is supported by research in the chemistry and microbiology of seawater in recirculated systems, shellfish nutrition, and the biochemical and structural aspects of bivalve shell growth. Five full-time professional scientists and engineers, three part-time University academic staff scientists, ten highly qualified full-time technical assistants and five full-time graduate students constitute the mariculture staff. The activity is funded in large part by the Sea Grant College Program of the National Oceanic and Atmospheric Administration of the Department of Commerce and substantially by the University of Delaware, the State Government of Delaware, and industry through the College's Industry Partner's Program. The current year's support of research operations is approximately $450,000 from all sources.

Two years ago advances in mass algal culture, hatchery techniques and shellfish husbandry made clear in the need for expanded physical facilities to grow algae under daylight rather than artificial illumination. Consequently, a 3000 square foot greenhouse was installed and operated successfully to culture algae in 10,000 liter batches. It was also evident that this expedient would need to be superceded by an advanced facility. A mariculture laboratory, including a unique 200 bushel controlled environment prototype shellfish culture unit, was planned (Fig. 4). The Economic Development Administration made available $1,200,000 toward the Mariculture Laboratory and construction commenced in November, 1977. The activities at this new facility, to be occupied early in 1979, will be under the guidance of the Center for Mariculture Research established in the College of Marine Studies.

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A prime mission of the laboratory is to operate a 200-bushel per year shellfish culture prototype system which will employ recirculating seawater in a controlled environment (Fig. 5). This unique prototype has evolved through nearly a decade of research and has as its initial objective a thorough technical and economic analysis of a controlled environment mariculture system. It will serve as a model for systems elsewhere in the United States and abroad which will produce high quality marine protein in the most efficient manner available through present technology.

The prototype system will be housed in a greenhouse with about 5000 square feet of enclosed area. Eighteen cylindrical algae reactors approximately 30 inches in diameter and 10 feet high will provide, daily, the 8×10^{14} (sic) cells required to feed that population of shellfish which when harvested monthly will provide 200 bushels per year. These algae reactors consist of transparent vertical cylinders of a diameter specified to optimize the carbon fixed by photosynthesis. They are to be managed so that growth of the algae takes place during the daylight hours, and they are harvested during early evening to minimize the impact of dark respiration. The cultures will be harvested and the shellfish fed at 10^7 cells/ml. This high density will allow minimum water recirculation rate and lower capital cost for water treatment facilities. This facility will, for the first time, permit detailed cost analysis of a controlled environment mariculture system by which to judge feasibility of commercialization.

COMMERCIAL STATUS

As you know, universities conduct research both for the education of future leaders in business, government, and research as well as for the discovery of new knowledge. In addition, we make full use of Sea Grant sponsored marine advisory service capabilities to bring the results of our research to commercial uses at the earliest possible time. Strong interest has been shown by major food industries in the potential of our research. Their interest is continuing, and in fact increasing, as evidenced by a five year grant by the Campbell Soup Company to support our shellfish nutrition work and a three year commitment by Unilever Limited of England and Borden's Incorporated to become mariculture industry partners and to support our research.

As our work proceeds, we are involving engineers and economists to a greater degree so that the selling price of shellfish produced in a closed system can be estimated with greater accuracy to determine when an attractive return on investment can be achieved by a commercial operator.

NEXT STEPS

Now I want to address the question "What should we do next?" In our view, there are several logical actions. First, we must continue as planned with our Sea Grant sponsored research and operate the planned 200 bushel per year prototype.

The second action we believe is logical to accelerate this work to a commercial scale is to follow the recommendations of the NOAA aquaculture plan and increase the level of annual research support to the University of Delaware to $800,000 per year for the next few years. This will be an increase from our present Sea Grant research budget of approximately $450,000. The increase will be used for such important work as selective breeding, hybridization, experiments using faster growing species and other desirable marketable marine animals and plants, development low-cost automatic monitoring and control instruments for commercial controlled environment systems, and the development of satisfactory artifical seawater sources to name just a few. This step to increased funding might logically be made by designating the Delaware aquaculture project as a National Project under the existing Sea Grant authorization.

The third action should be to plan how to build a prototype commercial production facility to produce 100,000 pounds of meat per year, or approximately 8000 bushels. We will be ready to design such a facility during the coming 12 to 18 months based on experience with the 200 bushel system we will build and start operating within the next year. The 100,000 pound per year prototype will be an industrial demonstration unit. This would be built and operated

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in close cooperation with industry or a cooperative of existing fishermen who would like to become part of this new business. It would be set up on a full commercial footing to try to reduce operating costs as low as possible and to maximize the inventive talents of the individuals who worked there. It is our belief that industry will need to see a facility of this size in operation before it will begin investing its own capital though I may be pleasantly surprsed by their earlier unilateral action. Our research team would be in close contact with this commercial scale facility to bring in new ideas and to solve new problems which will most certainly arise.

The fourth and final action should be a continued effort to involve the commercial sector. We envision a widespread seafood production industry using controlled environment techniques springing up throughout the United States and abroad using U.S. licenses. It may take the form of our extremely successful poultry industry. These industries, through a commercial association, could be expected to begin picking up some of the costs of the future research which will be required to support a maturing and increasingly sophisticated industry.

It is clear from the results of records cited earlier in the testimony that commercial shellfish production has a long history of steady decline. What is not yet widely known, except by commercial offshore clammers, large food companies and the National Marine Fisheries Service, is that offshore sources are being depleted steadily. This means that in the near future even our existing markets, not to mention new potential markets, will not be satisfied. The rapidly rising prices of oyster and clam meat verifies this situation.

LEAD AGENCY DESIGNATION

The question is the designation of a single lead agency for administering all aquaculture programs. The Department of Agriculture has shown leadership in the development of catfish farming and other freshwater aquaculture and is an agency charged with developing on-land food resources. On the other hand, the Department of Commerce has shown leadership in developing fisheries and marine aquaculture (or mariculture) and is the agency charged with developing salt-water food recources. In our opinion, to designate either agency as the sole lead agency for the cultivation of all plants and animals which may be of benefit to man, and the whole panoply of corollary and derivative subjects as presently known in agriculture alone would have serious shortcomings.

It is the considered opinion of the University of Delaware that the Department of Agriculture should be designated the lead agency for freshwater aquaculture and the Department of Commerce should remain the lead agency for brackish and salt water aquaculture (mariculture). We feel that this is consistent with the current strength of the two agencies and should benefit the development of aquaculture in the United States.

In our view, the most important and logical provisions to make in any and all aquaculture legislation is to provide adequately for equivalent states of both Land-Grant and Sea-Grant institutions as participants in research, development and demonstration activities.

Government should exercise reasonable regulation of commercial aquaculture and to provide services such as production data and information of use to individuals and businesses who wish to enter commercial aquaculture. This latter can be handled by expanded Sea Grant marine advisory service. The federal government should not dominate aquacultural research. Basic and applied research can often best be handled by universities and by business. The federal government nevertheless has a serious responsibility to ensure that problems of national needs are adequately met. There are many incentives for universities and industry to work in concert toward the success of aquaculture. The incentives need to be enlarged and intensified to help ensure success in the near term.

Commercial aquaculture can become a reality in the near future if we make full use of the resources and knowledge now available to us. Our objective, as a nation, needs be to create a viable food source and thus new bases of national wealth.

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Table 1

WHY CLOSED-CYCLE MARICULTURE?

	Closed Cycle	*Open Cycle*
LENGTH OF GROWING SEASON	Optimal growing temperatures can be maintained year-round with minimal energy and expense due to recirculation of the growth media.	Energy costs are extremely high due to once through heating and cooling of the growth media. The alternative is no temperature control which tends to lengthen the growing season for the crop in question in temperature latitudes.
FEED	Foods can be fed at higher densities than in nature and can be selected for nutritional suitability for the mariculture crop.	Phytoplankton densities generally are relatively low and highly variable in nutritional quality and quantity.
WATER QUALITY	Water quality parameters may be optimized to promote maximum health and growth in the mariculture crop.	Water quality parameters, such as oxygen levels and salinity, may vary in an uncontrollable fashion.
PURITY	Contaminants, such as chemicals and human and shellfish pathogens, can be avoided and/or treated if need be.	Little or no control can be exercised over contaminants.
RAW MATERIALS	Food and other growth factors can be recirculated to conserve raw material input into the system and, therefore, cost of these materials can be controlled.	Food and other growth factors can be lost to the system if the animals do not assimilate them in a timely manner.
ENERGY	Good potential exists for harnessing solar energy for growing food and other energy requirements in the system.	Although solar energy is available as an input, it is difficult to manage in an open system.
LOCATION	The system may be located anywhere as long as seawater or sea salts can be shipped to that location. Recirculated systems require relatively small amounts of make-up water.	Must be located on the coast where competition for use of space and water may be prohibitively expensive.
LABOR	Substantial potential exists for mechanization and automation reducing need for hand labor.	Due to husbandry and level of technology, substantial hand labor commitment is required.
OUTPUT	Reliable output rates are possible, based on year-round production that is not substantially affected by seasonal variations in climate.	Crops are seasonal and occasionally succumb to natural catastrophies, such as storm Agnes.

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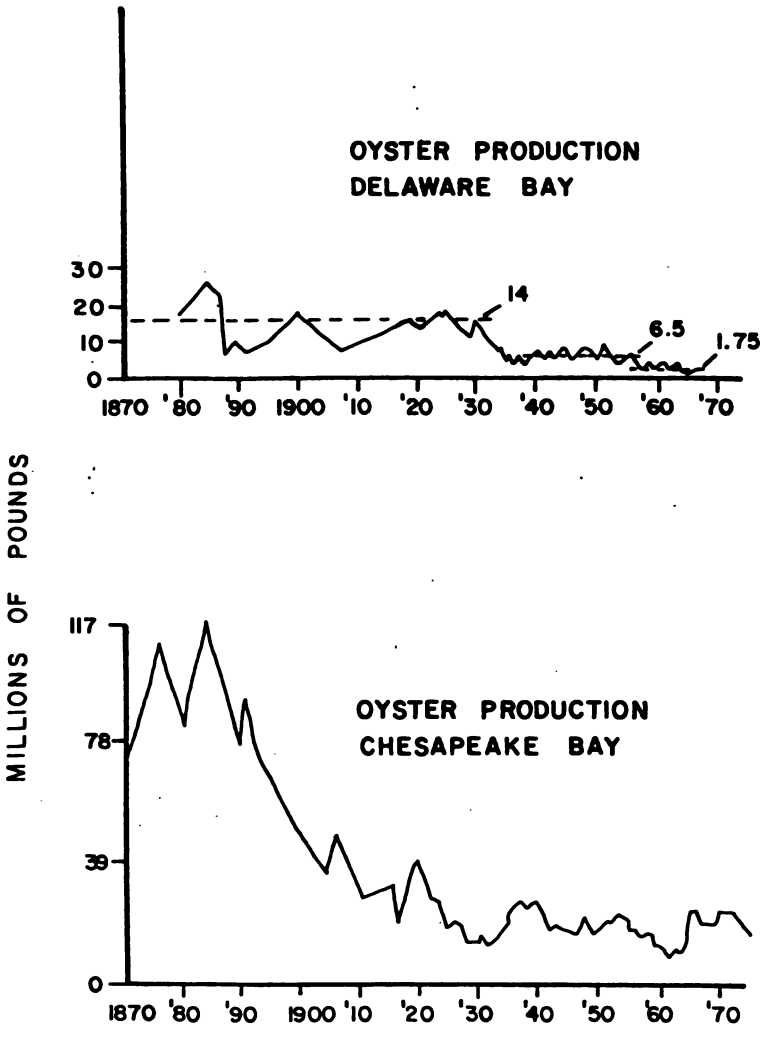

Figure 1.

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CLOSED CYCLE SYSTEM

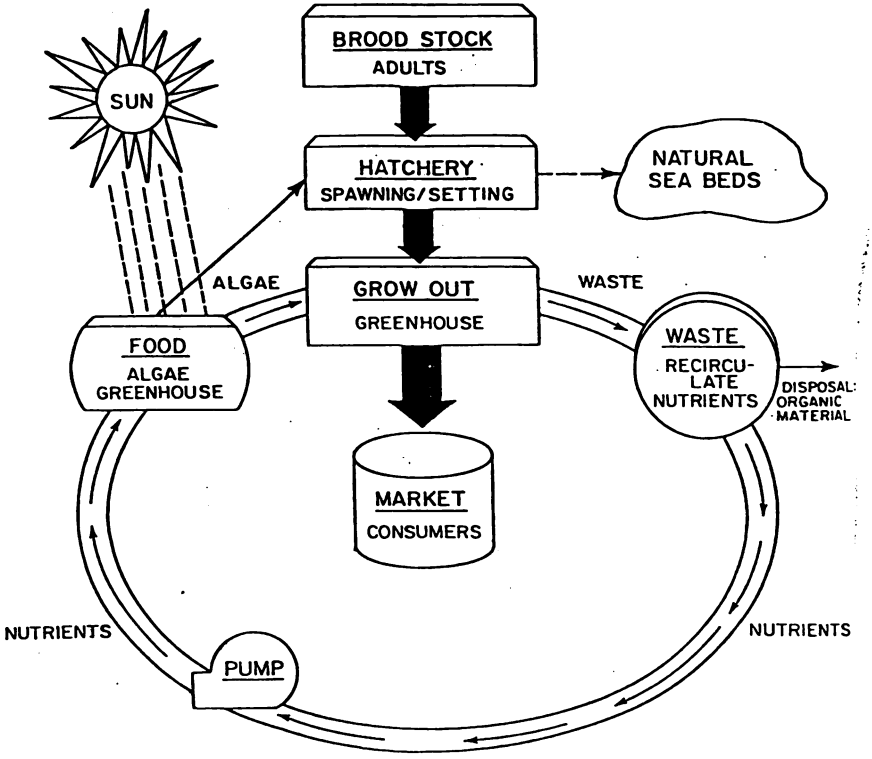

Figure 2.

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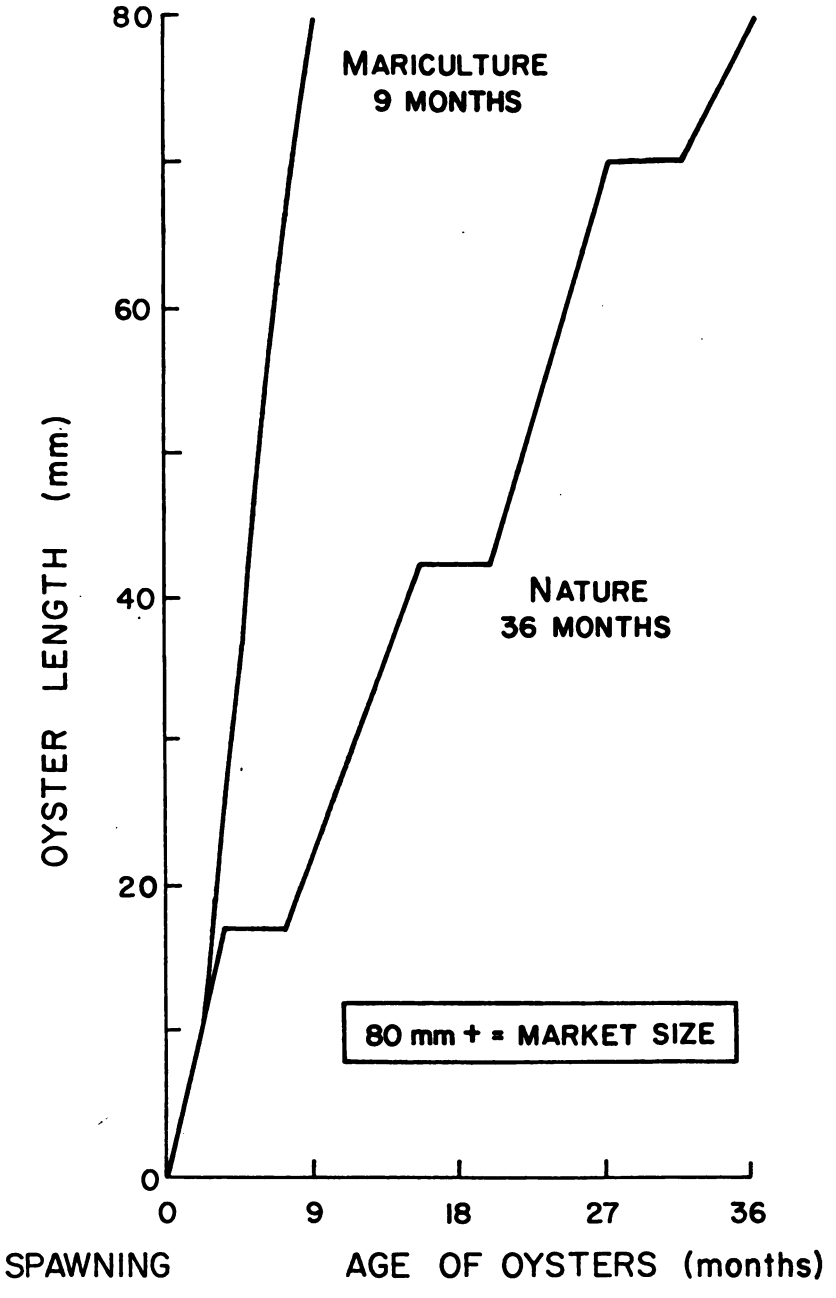

Figure 3. Oyster growth

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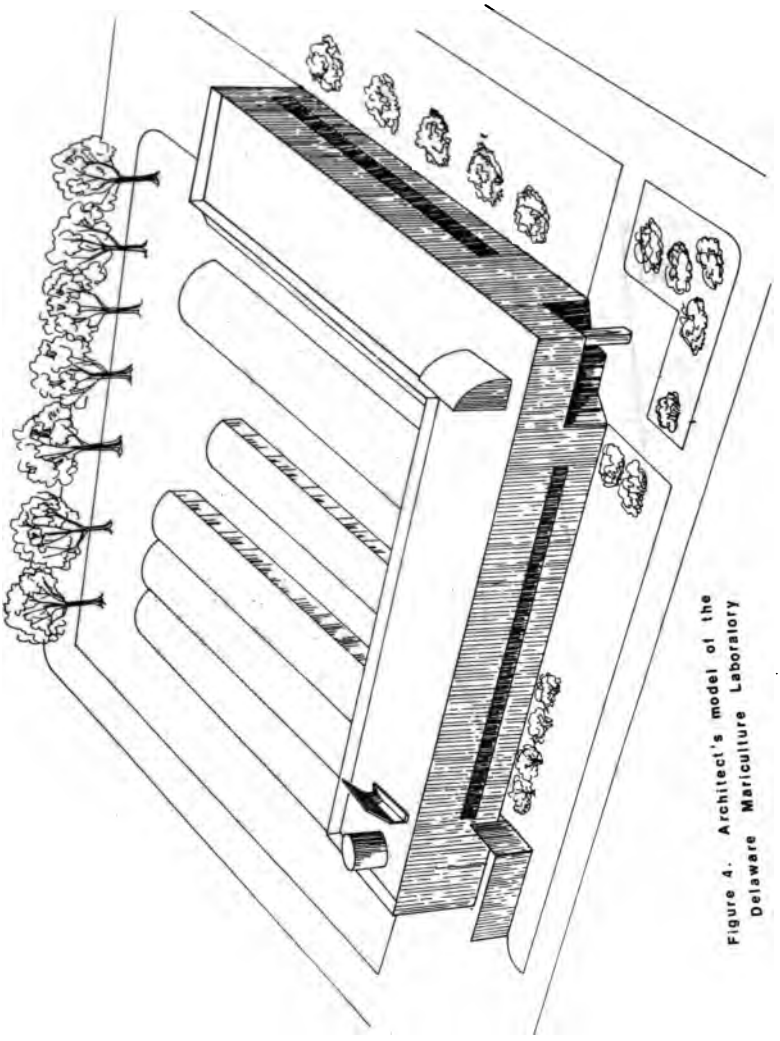

Figure 4. Architect's model of the Delaware Mariculture Laboratory

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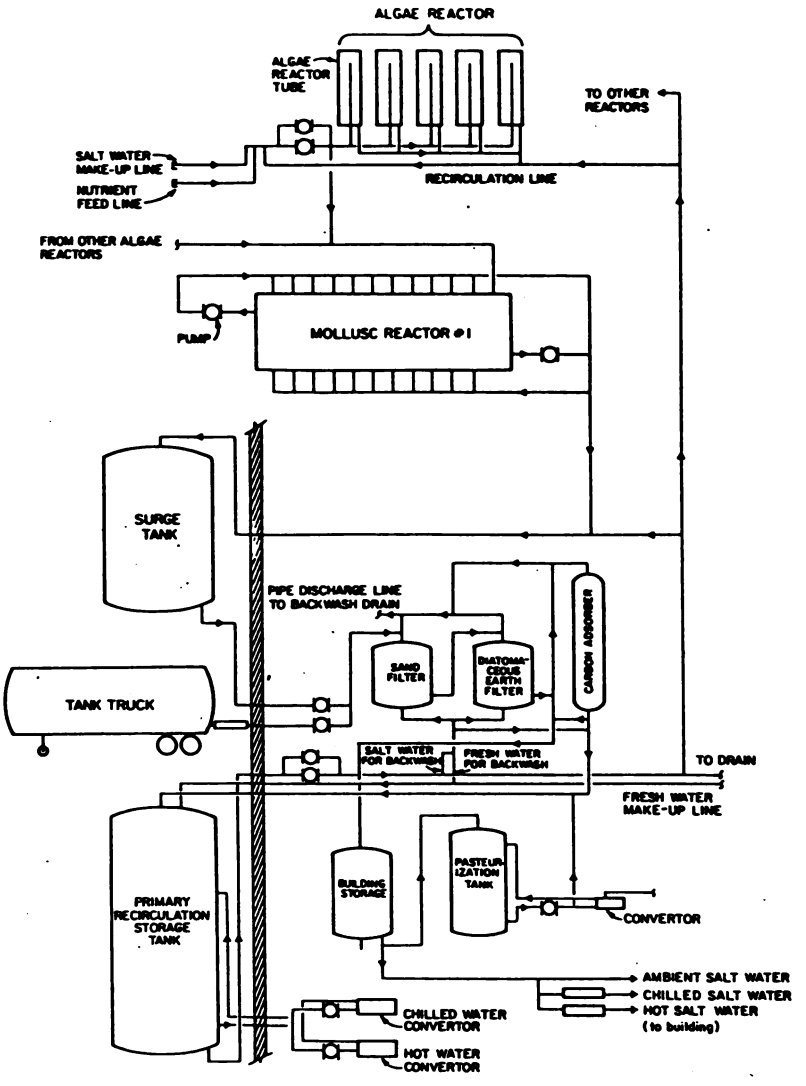

FIGURE 5. Prototype flow diagram of Delaware's 200 bushel System

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Basically, we are pleased that the potential value of aquaculture is being recognized in the United States of America. The State of Washington has, of course, been heavily involved in aquaculture for many years, as exemplified by our salmon culture program dedicated to the enhancement of the public capture fisheries. This program has long been financed through the State's general tax fund, although recent action by our State legislature has initiated a new program providing for a massive increase in salmon aquaculture facilities financed by user fees. This additional effort, together with enhancement resulting from a proposed settlement being prepared by the President's Task Force on Northwest Fisheries, will add enormous numbers of young salmon to our ocean pastures for harvest by our public fisheries.

Obviously, as with any other pasture, the capacity of the ocean is finite. Although we believe that salmon can at least be restored to their historical abundance, these limitations are currently unknown. We do know that returns on public investments in salmon production will decrease if carrying capacity is approached or exceeded. This could result from the addition of many more foraging salmon through the efforts of private sea ranchers.

Some additional changes could arise from private salmon sea ranching. Included among these are the possible impacts on those participating in the public fisheries due to portions of "treaty shares" harvested by sea ranchers as well as the probable increase in the cost of salmon enhancement sites resulting from private and public competition. On the other hand, there would probably be added an influential interest of a new industry in maintaining a favorable environment for salmon, as well as cost-saving salmon aquaculture innovations resulting from pressures unique to private enterprises. The desirability of these various impacts clearly depends on one's perspective.

However, in view of the State legislature's reluctance to pass conservative private sea-ranching legislation during the past two sessions, the very delicate situation that now exists among the various user groups, and the massive new salmon enhancement programs underway, we caution Congress to make sure that its actions are consistent with those of the State of Washington, the President's Regional Task Force on Northwest Fisheries, and the critical needs of the users of our existing public salmon resource.

Thank you.

Senator MAGNUSON. Generally, I think you've answered the question I have. I was going to ask what potential conflicts you see between the so-called private ocean ranchers and the State's public enhancement program.

You suggest that there might be a real potential for competition for salmon, for example; is that correct?

Mr. SANDISON. Correct.

Senator MAGNUSON. The facility sites are very important, aren't they?

Mr. SANDISON. Very important.

Senator MAGNUSON. There are only so many of them.

Mr. SANDISON. Yes; and as we attempt to obtain these sites now because of the possibility of it becoming an aquaculture setup, the

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ople are refusing to let go even marshlands that they would have ld before to anyone.

Senator MAGNUSON. I don't think any of the legislation intended get into the matter of sites. Specifically, we have to be consistent ith State laws and State control. We want to help you financially here the State had agreed upon a program. That is the general thrust the bills.

Mr. SANDISON. Yes.

Senator MAGNUSON. Of course, that also applies to the 49 other tates. We've become involved in the programs that have been carried n by the Department of Agriculture for many years, building farm onds, which have been very successful inland, but these bills extend he jurisdiction, or at least move out into the saltwater area, and that's here you have the problem.

There is, frankly, an argument between NOAA and the Department f Agriculture—I think you've heard about it—regarding who's to ake over the matter.

Now, what is the experience of your counterparts in Oregon regarding ocean ranching?

Mr. SANDISON. The director of the Oregon department, Dr. Jack Donaldson, who is a very capable biologist, was, prior to his being director, involved in that, and he has given us some pretty realistic expectations, and as yet—if I read Jack correctly—there is still a lot that they are going to find out and they also have the problem of how many cows can that pasture stand out there?

Senator MAGNUSON. The matter of sites is very important and very sensitive matter, is that correct?

Mr. SANDISON. That's correct.

Senator MAGNUSON. All right. Thank you very much, Gordie.

Now, Mr. Mahnken of the National Marine Fisheries Service, Dr. Conrad Mahnken. Glad to hear from you, Doctor.

STATEMENT OF DR. CONRAD MAHNKEN, NATIONAL MARINE FISHERIES SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Dr. MAHNKEN. Senator Magnuson, I'm with National Marine Fisheries Service, an agency of NOAA, and my purpose today is to outline NOAA's efforts and role in sea ranching in the Pacific Northwest; hat is, in Washington, Idaho, Oregon, and Alaska.

NOAA is active in both research and development of aquatic culture systems and directly supporting the production of salmon at public hatcheries. Established farming exists in the Pacific Northwest not only for salmon but for trout, clams, and oysters, the two major industries being private oyster production and public salmon hatcheries. NOAA is directing most of its efforts, however, toward the salmon.

Senator MAGNUSON. I think it ought to be clear that NOAA and your division are interested in the public hatcheries and not in private hatcheries.

Dr. MAHNKEN. That is right.

Senator MAGNUSON. You have nothing to do with private hatcheries?

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Dr. MAHNKEN. No; we have no direct link to private hatcheries at this point.

Senator MAGNUSON. And we wouldn't give you any money for it to begin with.

All right. Go ahead.

Dr. MAHNKEN. As you mentioned, salmon and steelhead hatcheries in the Pacific Northwest is where most of NOAA's support effort is going. These hatcheries are presently releasing about over 300 million fish annually to the public fishery.

There are two agencies within NOAA that share the responsibility for aiding these public hatcheries. They are the National Marine Fisheries Service and the national sea grant program, with activities primarily in the National Marine Fisheries Service located in Seattle with Northwest Fisheries Service and major sea grant activities at Oregon State University and the University of Alaska and the University of Washington here, but NOAA is also in charge of mitigation moneys which are allocated primarily to the hatcheries in the Columbia River in Washington, Oregon, and Idaho.

The majority of these funds are directly applied to the operation, maintenance, and upgrading of hatcheries in the Columbia River.

NOAA presently spends about $6.8 million a year, of which 70 percent goes to the direct support of hatcheries, the rest of the money going primarily to research and advisory services within the national sea grant program.

I would emphasize here that commercial sea ranching exists today only because of the technical background developed over the past 100 years by State and Federal agencies and their public hatcheries. For this reason I feel it's a mistake to relate our concept of ocean ranching strictly to the private sector.

The concepts and philosophies as well as the technologies for public hatcheries and commercial sea ranching is essentially identical. In some respects, it is unfortunate that a single term is not used to describe both of these systems, because when opposition is voiced against sea ranching, it often carries an unconscious indictment against research efforts which apply to our public hatcheries.

Thus, when NOAA conducts research and development into, say, marine net pen culture and a commercial venture results then NOAA is criticized for aiding industry, despite the fact that the Washington Department of Fisheries also uses this technology for enhancement of recreational fisheries in the south Puget Sound.

Similarly, when Federal legislation is proposed for aiding aquaculture, the fishing community opposes it because aquaculture has come to mean in this area private commercial ranching.

You asked the question a little while ago, Senator, about Oregon, the State of Oregon. Maybe I could just fill you in quickly as to where sea ranching is legal and where it is not legal.

Alaska allows private nonprofit aquaculture, but only to enhance the fisheries. The State is providing long-term low-interest loans primarily to fishermen's co-ops and Native American groups. The projects are allowed to sell returning fish, but are only supposed to make enough money to sustain their operation, so in Alaska the State wholeheartedly supports sea ranching on a nonprofit basis.

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Canada and Washington do not presently——

Senator MAGNUSON. If a group of fishermen got together in a nonprofit cooperative, and wanted to go into some kind of ranching, could that be allowed?

Dr. MAHNKEN. That is allowed.

Canada and Washington do not presently allow private salmon ranching; saltwater net pen rearing or sea farming is allowed in both Canada and Washington.

Oregon and California both allow salmon ranching for profit.

It is accurate to say that the whole concept of sea ranching has become a highly emotional issue, an industry that's already fraught with controversy with what is conceived as even further constraints.

Senator MAGNUSON. You're talking about private sea ranching?

Dr. MAHNKEN. Yes; I'm talking about private sea ranching now.

There is something ingrained in our thinking about the common property nature of free swimming fish in public waters. The idea that inside of some boundary, part of these fish ought to belong to a private corporation threatens tradition.

Today, fishermen have some control over public hatcheries, and they feel their role would be diminished with big industry entering into production.

It is interesting to note that in Alaska sea ranching is nowhere as controversial as in Washington and in Oregon, where its major proponents are large corporations. Nevertheless, the concept in both those areas is the same, the biological technical concept.

Senator MAGNUSON. You have an interesting figure here. In 1976 three private rearing facilities were operating in Oregon and California, and as I recall, one of them was specified by a special law.

They release less than 1 percent of the fish from the private hatchery—that is, the public hatchery, less than 1 percent.

Dr. MAHNKEN. Right.

To follow up on that point, if you look at projections——

Senator MAGNUSON. And this is only for the three in Oregon and California where it's allowed.

Dr. MAHNKEN. There are presently about a dozen permits issued in Oregon, people gearing up.

Senator MAGNUSON. That will up it considerably, won't it?

Dr. MAHNKEN. That will up the projections for 1990 to about 10 percent for the total release of public hatcheries.

Senator MAGNUSON. All right. We'll put your statement in the record in full, and we appreciate this information.

[The statement follows.]

STATEMENT OF CONRAD MAHNKEN, OCEANOGRAPHER, NATIONAL MARINE FISHERIES SERVICE, NORTHWEST AND ALASKA FISHERIES CENTER, COASTAL ZONE AND ESTUARINE STUDIES DIVISION, NOAA, SEATTLE, WASH.

INTRODUCTION

My purpose today is to outline NOAA's efforts and role in sea ranching in the Pacific Northwest, that is in Washington, Idaho, Oregon, and Alaska.

NOAA has been active in both research and development of aquatic culture systems and in directly supporting the production of salmonids at public hatcheries since the NMFS became a part of NOAA in 1971.

Established farming exists in the Pacific Northwest for salmon, trout, clams, and oysters, with the two major industries being private oyster production and public salmon hatcheries. The potential exists for greatly increasing the production of these species as well as producing scallop, marine [illegible] vario

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finfish, and marine algae for direct or indirect human consumption. Although NOAA is directing some of its efforts towards these other species, most of its efforts have been directed towards the salmonids because of the obvious economic importance of these fish.

The salmon and steelhead trout hatcheries of the Pacific Northwest and the most highly developed and technically sophisticated aquatic culture systems in the world. The hatcheries have been developed in large part to enhance declining natural runs resulting from dam construction and loss of natural habitat. These hatcheries have enjoyed unparalleled success in providing fish for a large segment of the U.S. salmon fishery. Releases now average more than 300 million fish annually. These massive releases of juvenile salmon and steelhead trout are presently justified by favorable benefit-cost comparisons. For coho and fall chinook salmon, the two principal commercial species, these ratios are 7 : 1 and 4:1 return respectively for each federal dollar invested.

NOAA'S ROLE IN RESEARCH AND OPERATION OF ANADROMOUS SALMONID HATCHERIES

Two agencies within NOAA share the primary responsibility for aquaculture, the National Marine Fisheries Service (NMFS) and the National Sea Grant Program (NSGP). NMFS research activities are centered in the Northwest and Alaska Fisheries Center with active salmonid aquaculture programs at the Auke Bay Laboratory in Juneau, Alaska and the Manchester Field Station on Puget Sound, Washington. Major NSGP research activities are located at Oregon State University and its Marine Science Center at Newport, Oregon; at the University of Alaska; and at the University of Washington and its field station at Big Beef Creek on Hood Canal, Washington.

Mitigation monies which are allocated to Washington, Oregon, and Idaho for the operation of Columbia River hatcheries are channeled through the Environmental and Technical Services Division of NMFS in Portland, Oregon. The majority of these funds are applied directly to the operation, maintenance, and upgrading of mitigation facilities on the Columbia River. Authorization for these expenditures is a result of the Mitchell Act. The value of fish from the 28 NOAA-funded facilities to the Pacific Coast sport and commercial fisheries is estimated at $33 million annually.

Present annual expenditures for aquaculture in the Pacific Northwest and Alaska by NOAA are as follows:

	Thousands
1. Direct NMFS funding to state agencies for operation, maintenance, and upgrading of public hatcheries on the Columbia River and its tributaries[1]	$4,250
2. NMFS operational improvement studies for hatcheries	480
3. NMFS research and development for salmonids	1,201
4. NSGP research and development for all species (approximately ½ is for salmonids)	763
5. NSGP extension and education services	99
Total NOAA expenditures	6,793

[1] NOAA and its predecessor agency, the Bureau of Commercial Fisheries, have invested a total of $26,000,000 over the years in modernization of Columbia River hatcheries which have an estimated current replacement value of $75,000,000 to $80,000,000.

NOAA's efforts in salmonid culture are aimed primarily at the development of marine and freshwater artificial propogation systems for use by public management agencies and will probably continue to emphasize these aspects in the near future.

NOAA research activities for salmonids in the Pacific Northwest & Alaska can be divided into six categories:

1. Studies on identification, control, and prevention of major diseases affecting hatchery and pen-reared salmon and trout.

2. Releasing coho salmon smolts, and pink and chum salmon fry for evaluating ocean ranching in selected Alaska locations.

3. Consulting and advising the State of Alaska, salmon processors, fishermen native corporations, and legislative committees on various aspects of gravel incubator hatcheries, pen-rearing systems, and ocean ranching for salmon.

4. Selective breeding programs with various stocks of Pacific salmon to produce strains best suited for culture efforts.

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5. Determining nutritional requirements for cultured species and developing cost-effective feeds which will satisfy their nutritional need.

6. Development of physiological and pathological measures for determining the quality of smolts released from public hatcheries and how this relates to adult survival.

I would emphasize here that commercial sea ranching exists today only because of the technological background developed over the past 100 years by state and federal agencies in their public hatcheries--primarily in Washington and Oregon. For this reason, I feel it a mistake to relate our concept of ocean ranching strictly to the private sector.

The concepts and philosophies as well as technologies for public hatcheries and commercial sea ranches are essentially identical. In some respects, it is unfortunate that a single term is not used to describe both systems because when opposition is voiced against sea ranching, it often carries an unconcious indictment against research efforts which apply to our public hatcheries. Thus, when NOAA conducts research and development into say marine net-pen culture, and a commercial venture results, then NOAA is criticized for aiding industry despite the fact that the Washington Department of Fisheries also uses this technology developed for enchancement of recreational fishing in Puget Sound. Similarly, when federal legislation is proposed for aiding "aquaculture" the fishing community opposes it because salmon aquaculture has come to mean private, commercial sea ranching, despite the inclusion in the legislation of aid to public hatcheries.

In its broadest definition, aquaculture should include any activity of man that directly aids adult returns—including public hatcheries; management strategies for wild stocks; and other enhancement or rehabilitation schemes (including ocean ranching).

PROSPECTS FOR COMMERCIAL OCEAN RANCHING

How have the Pacific Coast states and Canada viewed increased artificial propagation of salmon? All states and Canada have taken a biologically optimistic view. All have projections for increased artificial production of salmon.

But as regards private sea ranching, the vote seems to be split. Alaska allows private nonprofit aquaculture, but only to enhance the fisheries. The state is providing long-term low interest loans primarily to fishermen's coops and native-American groups. The projects are allowed to sell the returning fish, but are only supposed to make enough money to sustain their operation.

Canada and Washington do not allow private salmon ranching. Saltwater net-pen rearing for profit is allowed. However, if any fish are released or escape from private facilities, the fish become public property. The private company cannot harvest the returning adults.

Oregon and California allow salmon ranching for profit. California is being very conservative with private operations; one farm operates under special legislation on a test basis.

Opposition to sea ranching can be divided along political and biological lines. It is not my place today to dwell on these issues. However, it is accurate to say that the whole concept is a highly emotional issue that hits an industry already fraught with controversy, with what is conceived as even further constraints. There is something ingrained in our thinking about the common property nature of free swimming fish in public waters. The idea that inside of some boundary part of these fish suddenly belong to a private corporate grant threatens tradition. Today fishermen have some control over public hatcheries, and they fear the role will be diminished with big industry entering into production. It is interesting to note that in Alaska sea ranching is no where as controversial as in Washington and Oregon where its major proponents are large corporations.

PROSPECTS OF OCEAN RANCHING

What is the present status and potential of sea ranches and their likely contribution and impact on public hatcheries and a free enterprise fishery? Perhaps some background on releases of salmon and steelhead trout would broaden your prospective. As I indicated earlier, in 1976, 151 public artificial rearing facilities on the Pacific Coast released near 300 million salmon and steelhead trout. The facilities (hatcheries, ponds, and saltwater net-pens) are located in Alaska, British Columbia, Washington, Idaho, Oregon, and California.

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In 1976, three private rearing facilities in Oregon and California made releases of 1.6 million salmon, less than one percent of the releases from public hatcheries in Washington, Oregon, and California.

These figures describe what is presently happening—but what is projected for the future? Private hatcheries in Oregon (there are about a dozen licensed sea ranchers) are projecting releases of 261 million chinook, coho, and chum salmon. The one California facility is projecting future releases of 1 to 2 million coho salmon. How about future releases from public hatcheries? Projections from Alaska, Canada, Washington, Idaho, Oregon, and California are for the release of 2.6 billion salmon by 1992.

The biological ramifications of these massive releases are completely unknown. One hypothesis argues that the capacity of coastal waters to grow certain species and stocks of salmon is being approached and that releases of additional young fish will not result in larger populations of harvestable adults. Evidence in favor of this hypothesis revolves around the observation that the harvest of coho salmon has not increased in recent years despite increased releases of juveniles from hatcheries. However, the fact of the matter is that no sound data are available supporting an argument for or against a limit to ocean carrying capacity.

In conclusion, NOAA does not view commercial sea ranching as a serious threat to the existence of publicly supported hatchery systems in Oregon, Washington, and Idaho based on total projected releases. Nor is it a threat in Alaska where few hatcheries presently exist and where private nonprofit sea ranching is considered as partial replacement of public salmon hatcheries.

The fact of the matter is that commercial sea ranching, if properly controlled, can make significant contributions to the commercial catch without the expenditure of federal or state tax dollars, allowing the state agencies to concentrate on the enhancement of seriously declining wild stocks. Herein lies NOAA's major interest—i.e., the development of the most cost-effective production systems for salmon and steelhead trout and the continued availability of this high quality fisheries product for the American fisherman and consumer. The wise management of these new systems will tax the innovation of fishery managers for decades to come with the major problems being common to both public and private hatcheries.

Senator MAGNUSON. Our next witness is Mr. Harlan Freeman.

STATEMENT OF HARLAN G. FREEMAN, MANAGER OF AQUACULTURE, WEYERHAEUSER CO.

Mr. FREEMAN. Thank you. My name is Harlan Freeman, and I'm manager of aquaculture for the Weyerhaeuser Co. I'm also president of Oregon Aqua-Foods, a wholly owned subsidiary of Weyerhaeuser Co., engaged in salmon ranching in Oregon.

You should also understand that Weyerhaeuser operates a shrimp farm in Florida.

Salmon ranching is rearing, releasing, and recatching salmon by private individuals and corporations. Until recently, this has been practiced only by the public sector, the State and Federal hatchery system.

Salmon ranching is expensive and risky. For those reasons, salmon ranchers need the support embodied in national aquaculture legislation. At the same time, the benefits to society of private salmon ranching for profit are manifold.

Salmon ranching benefits all interest groups—the sport fishermen, the commercial fishermen, the ocean rancher, and the consumer. Salmon ranchers buy salmon eggs from the public agencies, thus helping them with their budget problems; hatch the eggs, rear the small salmon and release them, increasing the catch of the sport and commercial fishermen, and also increasing the tax return to the public agencies through catch-and-yield taxes paid on those salmon. Ranchers finally recapture quality salmon for consumption on the tables of the American con-

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sumer. Thus, salmon ranching means more salmon at no cost to the taxpayer.

Private salmon ranching, because of its benefits to all the interest groups and concerns, should be part of this legislation. No other type of acquaculture that I know of benefits the entire industry from the fishermen through the processors, distributors, and finally, consumer.

I am in favor of national aquaculture legislation. For all the reasons outlined in H.R. 9370, in addition to the reasons covered in the testimony on that legislation as documented in the Congressional Record, we favor aquaculture legislation. The time for aquaculture has arrived, and it behooves our Congress as well as our President to recognize aquaculture for the first time in the history of our country as a vital force that has the potential to provide wholesome food to our citizens and those of other nations, to help with our balance of payments, to provide jobs and other economic developments, and finally, to provide high quality protein in a more energy-efficient way than the traditional fish hunting of the past.

Given the recognition in Congress that the time of aquaculture has arrived, a number of pieces of legislation are presently in the Senate. The bills differ in many respects, and I won't go into them individually but I will indicate conceptually and philosophically the concepts that our company feels should be embodied in aquaculture legislation.

The principal need of aquaculture at the present time is knowledge. I am talking about research and development in nutrition, genetics, management systems, bioengineering, and disease control.

This industry has progressed to its present point partly due to the research efforts under Sea Grant, the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and, to some extent, the Soil Conservation Service under the Department of Agriculture. I feel that such research in the past has been largely very productive and that it should be continued at higher levels.

We feel future research by these agencies should be coordinated. Duplication of effort must be avoided. Research programs that reinvent the wheel must be eliminated. The research efforts must be focused on those 5 or 10 species that consumers are willing to buy and that aquaculturists are able to produce.

In that way, maximum benefit can be achieved with the least cost. In order to accomplish those research goals, a lead agency should be selected and representatives of that agency, along with those from the sister agencies which at present or in the future are likely to be engaged in aquaculture programs, should develop a national aquaculture plan.

Consistent with the developed plan, the aquaculture program should then be conducted by the respective Federal agencies. As I stated earlier, duplication of effort and quarreling over turf should be avoided as much as possible.

In development and administration of the national aquaculture plan, input should be solicited from the various industry groups such as the National Fisheries Institute, the Catfish Farmers of America, the U.S. Trout Farmers Association, the American Salmon Growers Association, and the National Shellfish Institute, among others.

If, as a result of national aquaculture legislation, research and development needed by aquaculture is funded, what else needs to be done?

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An extension of the R. & D. should be pilot programs. Such pilot programs should be carefully and judicially selected, requiring matching funds with the aim of ending up with demonstration projects that have meaning.

As an example here would be aquaculture utilizing waste heat from power-generation plants. A variety of small studies have been completed or partly completed over the years, but no projects of any magnitude, say, above 40 acres in size or producing more than one-half million pounds per year, has ever been built. The risks are too great; in some cases the technology just does not exist.

The economic payoff from utilization of powerplant waste heat for aquaculture has tremendous potential, and this committee could provide great assistance for aquaculture by exploring and removing those regulatory barriers not necessitated by public safety, to use waste heat.

Other barriers are institutional; among them the Delaney amendment which essentially precludes utilization of waste heat from nuclear powerplants for aquaculture aimed at human consumption.

A goal of a national aquaculture plan could be to crack the impasse in order to allow utilization of that wasted energy to produce food energy for people.

Constraints on orderly development of aquaculture tend to be political and administrative, according to the National Academy of Sciences. We support the recommendations of the report of the committee on aquaculture of the National Academy of Sciences, entitled "Aquaculture in the United States, Constraints and Opportunities."

The other aspects of the present legislation and those which cost the major amounts of the enumerated expenditures are the loan guarantees, the disaster loans and the disaster insurance. We generally are not in favor of such loans and guarantees; we would not make use of them, and we feel the dollar magnitude of these programs shoud be dramatically reduced. Such reduction ought to make the legislation much more palatable to the administration.

In summary, we support your efforts to pass national aquaculture legislation. We feel the time is ripe. We feel the legislation should deal with the interagency cooperation and avoid duplication of effort, and that the primary thrust should be on research and development. We support the National Academy of Sciences study, and we feel that if cost of this legislation is of significant concern, that top priority should be given to research and development.

I would like to submit for the record the 1978 status report of Oregon Aqua-Foods.

Senator MAGNUSON. Very well, we will insert it into the record.

I think the record should show that aquaculture involves all kinds of other things including salmon. There is great support in the gulf for shellfish, as well as on the east coast and New England, but we get to a matter here where salmon is different. It is an unusual stock and has many, many problems.

Some farmers have been able, with 2 acres of water, to raise more protein for their own use than they do on 20 acres of land. It's a broad subject.

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But today, of course, we're concerned more with aquaculture as it pertains to salmon. I don't think there is any particular opposition to research in the other fields.

Now, the State of Washington has recently rejected legislation legalizing ocean ranching, and all three of the bills provide for State control and do not except any Federal law. The State can pass any restriction they wish, and as pointed out by Mr. Sandison and Dr. Mahnken, Washington and Canada have restrictions; Oregon and California do not.

Now, the State of Washington has embarked on a $33 million public salmon enhancement program. If private ocean ranching should be legalized in the State of Washington, what impact would it have on this program, in your opinion?

Mr. FREEMAN. In my opinion, Senator, the two things that are customarily talked about are competition for sites and competition for eggs. Specifically, the proposed legislation in Washington restricted ranchers to saltwater or to tidal influence.

As far as I know, the Department of Fisheries has no designs on any sorts of sites that involve that sort of land. I've studied their salmon enhancement plan. As far as I can tell, there is no competition for sites.

The other thing one hears about is competition for eggs, and at present time the Washington Department of Fisheries has an egg allocation policy, and they're selling eggs to ranchers.

I think if you will study the Washington Department of Fisheries' records, and I'm talking about tables 2, 3, 4, and 7 in their report No. 30, going back over the past 14 years for the principal species chum, chinook, and coho salmon, the Department utilizes between 19 and 60 percent of the available eggs, so I really don't see competition for eggs as an issue.

Senator MAGNUSON. Well, there are groups here today that will strongly disagree with you on that, and they suggest that ocean ranchers, or private ocean ranchers, will eventually try to restrict the fishing in Oregon and enhance their own return. How do you respond to that?

Mr. FREEMAN. I guess I've heard that argument many times, and that argument is always described as our vast political power. I think it's an insult to you, sir, and I will say beyond that that——

Senator MAGNUSON. You can't insult me. I'm a battle-scarred veteran.

Mr. FREEMAN. We've been trying to get ranching passed in this State for the past 5 years, and we haven't had much success, so I don't see any evidence of vast political power.

Senator MAGNUSON. What would be the effect on private ocean ranching for profit if it were excluded from the bill?

Mr. FREEMAN. I think the principal effect would be——

Senator MAGNUSON. I'm talking about salmon.

Mr. FREEMAN. I understand that. I think such exclusion would be a mistake. The principal reason, is that it sets a very dangerous precedent. There have been complaints about lobster farming in Maine, and there are complaints about abalone farming in California, because of pressure of commercial fishing interest groups. If we start excluding

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certain species from the national aquaculture legislation, in reality we probably should not have that legislation.

Senator MAGNUSON. All right. Thank you very much.

[The article referred to follows:]

STATUS REPORT, OREGON AQUA-FOODS

Oregon Aqua-Foods was started in 1972 with first ocean ranch releases in 1973. Weyerhauser acquired Oregon Aqua-Foods in August of 1975. Total releases since the beginning of Oregon Aqua-Foods as of May of this year are 3,553,682 salmon smolts. Three species, Coho, Chinook and Chum, have been released with Coho and Chinook salmon accounting for just under 90 percent of the releases.

Oregon Aqua-Foods has approximately 10 million salmon at the Springfield hatchery at the present time which will be released at Newport during the spring and summer of 1978. Almost all of these salmon are Coho.

Total adult returns to the saltwater facility at Newport number 6,880. Most of these, of course, are Coho since most of the releases have been Coho. Average length of returning Coho adults was 25" with weight of adults ranging from 6 to 10 pounds. For Chinook adults returning to Oregon Aqua-Foods, average length was 35" with average size of 22 pounds. These were a mixture of three- and four-year olds. In later years, as five-year olds begin returning, the average adult size will undoubtedly rise.

Oregon Aqua-Food's releases to date have contributed to the fishery. In its early years, Oregon Aqua-Foods used a half dorsal clip on Coho smolts. These fish were released in 1974 and adults recaptured by fishermen in 1975. Over 70 of these salmon were reported captured in the fishery with all reports being south of Newport, principally centered in the Coos Bay area. In later years, Oregon Aqua-Foods has used the coded wire tag such as is used by public salmon enhancement agencies. Tagged salmon have been captured in both Oregon and Washington with most again being reported south of Newport. On an overall basis, Oregon Aqua-Food Coho contributed more salmon to the Oregon fishery per zero smolt released than did the Oregon Department of Fisheries and Wildlife tagged Coho salmon. We think that such performance is outstanding given that Oregon Aqua-Foods is only just beginning with stocks of salmon that haven't yet been tuned in to the particular facilities and geography. Average length of the Coho captured in the fishery was 24" with average dressed weight between 5½ and 6 pounds. Round weight would be approximately 20 percent more than dressed weight.

Oregon Aqua-Foods releases zeros, that is Coho salmon that are only six months old and that have been accelerated by utilization of warm water in their hatchery phase. Such accelerated salmon produce fewer jacks than do the yearlings produced by nature and by the agencies growing salmon in the conventional manner. Jacks are generally less desirable in the sport and commercial fishery. Thus it appears that Oregon Aqua-Foods' accelerated zeros will produce proportionately more adults for recapture in the traditional fisheries than will conventional hatchery practice.

OCEAN RANCHING FACT SHEET

Question. Will ocean-ranched salmon depress the market?

Answer. No, ocean ranching entails considerable investment. Any marketing strategy to "dump" salmon or drastically reduce existing price levels lowers the return on that investment to uneconomic levels.

Question. How will ocean ranchers market their salmon?

Answer. Salmon is an international commodity with excellent markets in Japan, Europe and the United States. It is anticipated that ocean ranchers would sell large quantities of frozen salmon overseas. Since the return season is late fall, it can also be anticipated that a good fresh market exists in the United States at a period of time when little fresh salmon is available from other sources. Thus, ocean ranchers will not be competing with commercial fishermen in the fresh market or dock-side. U.S. exports of Pacific salmon have risen dramatically in recent years and in 1977 Japan alone imported 42 million pounds of Pacific salmon.

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Question. Won't the increased salmon supply force prices down in this country?

Answer. No, an increased salmon supply offers new markets and promotional opportunities in the retail and institutional sectors. A more stable salmon supply will lead to increased restaurant use and frozen, prepared dinner makers can develop salmon lines confident of a steady supply. New product forms will also result such as frozen salmon loaf, extruded products and the like.

Question. Won't ocean ranchers release fish which trollers cannot catch?

Answer. Yes, many ocean ranchers plan to release chum salmon (in addition to coho and chinook). While chum salmon do not have as high a market value as coho and chinook, the cost of rearing and releasing them is considerably less. On a release weight basis, however, 90 percent of the smolts released will be coho and chinook and only 10 percent chum. The reason trollers catch few chum is that this particular species feeds primarily on small euphasid shrimp organisms and zooplankton and very little herring. With the proper technique, however, chum salmon can be caught with hook and line.

Question. What about genetically changing coho and chinook so they won't take a hook?

Answer. Coho and chinook gain about a pound a month while eating herring off the coast prior to returning. Any attempt to alter this natural feeding pattern could result in very low return percentages and fish of poor size and quality.

Question. Won't ocean ranchers attempt to change fishing seasons to provide for greater returns?

Answer. No, fishing seasons are set by state and federal agencies, not ocean ranchers. Seasons are established after public hearings and result from the need for adequate escapement of natural and state and federal hatchery runs to maintain adequate spawning for future enhancement. Thus ocean-ranched salmon, which spend some 18 to 48 months in the ocean, will increase the total available resource and take some the pressure off natural and hatchery runs.

Question. Can the ocean rancher document this contribution to the resource?

Answer. Yes, a certain percentage of salmon smolts the rancher releases are tagged. When these fish, which have the adipose fin clipped off to indicate the presence of the coded wire tag, are caught by sport or commercial fishermen, the snout containing the tag in forwarded to the appropriate agency (depending upon which state or country has landed). Based upon reported tags, an estimate can be made of the total contribution to the fishery. Analysis of tag returns from the 1977 season shows that private ocean-ranched salmon releases are contributing proportionally more to the catch by commercial and sport fishermen than are salmon released by the Oregon Department of Fish and Wildlife.

Senator MAGNUSON. Dr. Mahnken, are you still here? I think we should clear up the record on this one point, and you can answer it.

Would it be possible to manipulate either the genetics or the timing of the release of ocean ranch salmon so that they could not be caught by commercial or sports fishermen? Is this possible? I'm talking from a scientific standpoint.

Dr. MAHNKEN. Yes; I think in the case of timing of returns on the runs with existing fishing seasons, it is possible that you could have a run returning before and after the fishing season.

Senator MAGNUSON. Then we talked about the sites. Are the salmon that are recaptured at ocean ranching facilities as high quality as those caught by the fishermen?

Dr. MAHNKEN. The only experience I have to go on is what I have observed with Weyerhaeuser, down in Oregon.

Yes; in fact, the quality of the fish is very, very good, and equally as good as many of the commercially caught fish.

Senator MAGNUSON. What about the Manchester operation, Dr. Lindberg, he's raising the small ones for table use?

Dr. MAHNKEN. For table use; it's an entirely different product.

Senator MAGNUSON. That wouldn't be affected by this at all, would it? They don't go out to sea?

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Dr. MAHNKEN. If some escape, they do get out of the pens, and then they are part of the public fishery.

Senator MAGNUSON. Thank you, Doctor.

Our next witness is Paul Anderson of the Purse Seiners.

STATEMENT OF PAUL L. ANDERSON, PURSE SEINE VESSEL OWNERS ASSOCIATION

Mr. ANDERSON. Thank you, Senator.

I am Paul Anderson, executive manager of the Purse Seine Vessel Owners Association. I'd like to comment on the proposed aquaculture legislation, the three bills which are before you.

Before I begin testimony, I would like to take this opportunity to express our appreciation for your coming to Seattle, so that our views may be considered. This is a very important matter and greatly concerns the users of the salmon resource of the State of Washington.

This is evidenced by the telegrams sent by many of the user groups to you and the other Congress committee members April 16 of this year.

Senator MAGNUSON. I was very pleased to get that telegram, not necessarily on this particular subject, but this is the first time in all the years we've been involved, that you all got together on something.

Mr. ANDERSON. There's a first time for everything, Senator.

One of the user groups that sent the telegram, the Purse Seine Vessel Owners Association, represents the approximately 300 purse seine vessel owners and opeartors who earn their living by fishing for salmon in Washington and Alaska.

We concur with the findings, purpose and policy set forth in the proposed legislation.

The seafood prduction in the United States needs to be increased. One excellent method of increasing this production is through private aquaculture. Congressional action promoting private aquaculture would certainly increase at a faster rate the national seafood production.

We do, however, have concerns of how private aquaculture of salmon would affect the salmon fishery in Washington State. The salmon fishery in Washington State faces the problems of inexact management and competition for salmon stocks for the available natural resources.

The fishery in the State of Washington is also confronted with the disastrous effects of the Judge Boldt decision. I am sure you are well aware of the effects of this decision and I won't dwell on its effects at this time.

One major point of the Judge Boldt decision, however, was—that I will mention, since it relates to salmon ocean ranching, is that the Judge Boldt decision declared that treaty tribes are "self-regulating."

In other words, currently in the State of Washington, the Department of Fisheries manages the noncommercial and recreational salmon fishermen while each tribe regulates its own fithermen. Hence, there is potential of approximately 20 management agencies regulating the utilization of one resource.

This has proven to be very disastrous as a practice. If ocean ranching was encouraged in the State of Washington and assisted by fund-

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ing through your proposed legislation, it would add one more source of management complexity.

The tribes and the Department of Fisheries are striving to obtain uniform salmon enhancement guidelines to control the different agencies for rearing and releasing salmon.

Senator MAGNUSON. Well, Paul, I would like to clear up the record. When you mention my proposed legislation, I am just a conduit. This legislation had to come through the Commerce Committee. Although I believe in the general objectives presented, it is a broad piece of legislation. I don't reject any part of it, but it's not particularly my idea to begin with.

Mr. ANDERSON. Ok. I'm sorry if I made that inference.

Senator MAGNUSON. No; you didn't at all. It's got my name on it. I can't deny that.

Mr. ANDERSON. Without proper enhancement planning, it's evident that the stocks will clash with the biological behavior. There has to be one agency to set guidelines and principles and enforce the enhancement activities of salmon in the State of Washington.

At this point, introducing another source of salmon for ocean ranchers would further complicate the issue.

We hope through the task force efforts that there will be one agency setting the guidelines for this. To add another one right now would seem to us to be premature.

Senator MAGNUSON. That has to be cleared up.

Mr. ANDERSON. In 1977, the Washington State Legislature enacted a $33 million salmon enhancement program. This program was supported and, therefore, will be funded by the commercial and recreational fishermen in this State through increases catch taxes and license fees.

The Washington State Department of Fisheries will institute the enhancement program by building hatcheries or salmon-rearing facilities. The department of fisheries is in the process of purchasing land with good fresh water supplies so necessary for productive salmon propagation.

It is our concern that if private industry were encouraged to enter into the salmon propagation endeavors they would add detrimental competition for the purchase of available land and water sites.

The department of fisheries also needs to most efficiently utilize all of the available salmon eggs for this new program. Again, private aquaculture would detrimentally complete for the limited salmon egg supply.

In view of these factors, the department of fisheries should be the sole agency responsible for production of salmon.

In a more technical aspect, the ocean ranchers claim that salmon eggs they will use to begin their hatchery operations will be the surplus eggs not needed by the department of fisheries. The department of fisheries through its enhancement programs has attempted to separate the timing of different runs of salmon to avoid competition between the stocks and overharvesting of mixed stocks. Through genetic selection, the department of fisheries has been capable of effectively separating many of these stocks. This is done by utilizing eggs from salmon that pass through the fisheries at the opimum time while discarding eggs from salmon that return at the wrong time. The discarded eggs are determined surplus and disposed of.

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Hence, if the private aquaculture uses the surplus egs, they will be adding back into the system the very portions of salmon stocks that the department of fisheries is trying to weed out of the fishery.

To allow this to occur, after extensive work that was previously conducted by the Department of Fisheries does not make sense. The commercial salmon fishermen are proud of the product they provide for the consumer market.

Salmon harvested at hatcheries have reached the point in their spawning migration where their flesh has begun to deteriorate and their skin has degraded to an unappealing appearance. Such salmon harvested by private aquaculturists at their hatcheries sold to the public as fresh salmon would, in a short time, downgrade the public's image of an otherwise fine product.

This may be contrary to Dr. Mahnken's statement but I think you have to compare the conditions in Oregon versus Washington where in Washington you have a major estuarine area in Puget Sound.

And in conclusion, we wholeheartedly support the concept of increasing the Nation's fisheries production by private acquaculture. However, due to the complexities that currently exist in Washington State salmon fisheries and due to the fact that a massive salmon production program is underway, we request that the proposed legislation be amended to exclude private salmon aquaculture in Washington State.

We certainly appreciate your consideration of our comments on this very important matter, and again, we very much appreciate your coming out to the State to hear our views.

Senator MAGNUSON. Legislatively, the bill does not examine or preempt State laws, so if you have an amendment that would exempt salmon in Washington State and if the State law, as I understand it, does not allow the private ranching now, we wouldn't need the amendment unless we change the interpretation of the preempting of State laws. But sometimes people differ on interpretations, and we probably should be specific about it. But then we get down to Oregon, and they allow it, so we'll have to do something about the situation there.

Mr. ANDERSON. Our concern is that someone mentioned previously the difficulties trying to get this legislation passed through the State legislature, I think it's been 5 years now, and with these available funds——

Senator MAGNUSON. That's down in Olympia?

Mr. ANDERSON. Yes; and with the available funds in this bill, it's going to get harder for us.

Senator MAGNUSON. Now, who is next? Phil, why don't you proceed?

STATEMENT OF PHIL SUTHERLAND, PUGET SOUND GILLNETTERS ASSOCIATION

Mr. SUTHERLAND. Senator Magnuson, I'm Phil Sutherland with the Puget Sound Gillnetters Association.

I first express appreciation on behalf of the Puget Sound Gillnetters for this opportunity to express our views, in this important matter, with its potential impact on our State salmon fishery.

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It is with serious apprehension that the Northwest net fishermen regard their future. Opportunities to participate in this way of life so many of us have enjoyed for our lifetime are threatened from many directions.

Now comes before us yet another Government-considered issue that we view as a further menace to our existence. Our conception of what the establishment of private sea ranching facilities will mean to us are eventual extinction. Under the dire, current dire, condition of our court-castrated State fishery, it is beyond the scope of our imagination that any serious consideration would be given to that portion of the aquaculture bills that pertain to private salmon sea ranching here in the State of Washington.

In all the reams of articles and synopsis of how to solve our present fisheries dilemma, and indeed, between the slick covers of the recent 199-page task force proposal, it is left strangely unanswered.

But sooner or later it's got to be faced, to raise something other than paper fish, you must face an issue and come up with eggs and sperm. It's immaterial in the age-old argument of which comes the first, the chicken or the egg, that we use fish instead of chicken, but a stark reality lays it on us that to increase egg take for planned enhancement programs, present stocks of salmon will have to be enacted and less impacted from marketing for personal use, and utilized more for propagation.

Senator MAGNUSON. I'm hearing about this so-called egg shortage. I wonder if I shouldn't try to get the Federal participation in public hatcheries more. What about that? Gordon. I was thinking that we ought to be doing something about producing more eggs.

Mr. SANDISON. There is not enough.

Senator MAGNUSON. Does the State produce enough?

Mr. SANDISON. No; we are short of chum eggs at the present time, and as a result there is no surplus of chum eggs. We've had ocean ranchers and aquaculture people ask about it.

Senator MAGNUSON. Let's talk about this and see if we might be able to do something at that end, regardless of the bill, to enhance the production of more eggs. Would that be helpful for everybody?

Mr. ADY. I am Clement Ady. Senator, if there was less sale of eggs to private aquaculturists then we would have more eggs for the public utilization. Aqua-Foods in Oregon——

Senator MAGNUSON. We don't have any private sales in this State?

Mr. ADY. Oregon Aqua-Foods buys substantial Washington eggs.

Senator MAGNUSON. We have in the bill an authorization for increased egg production.

Mr. ADY. I see what you mean. I was thinking out loud. If there is a shortage, we ought to do something about it jointly.

Mr. SUTHERLAND. That's the only place we're going to point at, and I'm pointing this out as I continue and——

Senator MAGNUSON. Go right ahead.

Mr. SUTHERLAND. Open, well publicized, fairly administered programs in this direction certainly have endorsement of conscientious fishermen. In other words, enhancement programs. Their concern for their future has been well demonstrated by the past participation——

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Senator MAGNUSON. Let me put this in the record. On page 13 of the bill, section 5, paragraph (3), "produce, under the authority of section 4(c) (4), and sell at cost seed stock for the priority aquatic species when privately produced seed stock is unavailable, unreliable * * *".

That's in the bill. I just thought that should be in the record.

Mr. SUTHERLAND. Thank you, sir.

The fishermen's concern for their future has been well demonstrated by their past participation in self-instigated fish-rearing operations in Gig Harbor, Friday Harbor, Bellingham, plus the past voluntary proposed support of IPSFCC programs and on a poundage basis, and in assisting egg-taking operations without remuneration in the State hatcheries.

Under present impetus on acquiring eggs by reducing fish effort, hopefully by all parties, these enhancement goals, if acknowledged as practical, can nowise be reached with another monkey on our back such as the egg demands ocean ranching would create.

Three cycles or four cycles, 10, 12, 16 years, to attempt to rebuild Washington salmon runs, hopefully to their precivilization levels, a price must and will be paid, a price in dollars by us in reduced fishing time.

After 30 years of Puget Sound effort now at age 54, for sure, me and my fellow mature fishermen won't need ocean ranching demands to stretch that out any farther. Whether you hitch yourself as donkeys or elephants and whether you put the cart before or after us animals, the harness of ocean ranching won't fit commercial fishermen.

The egg acquisition issue is plain enough, but big business approach a safe journey home for their production is another facet for our prime concern. The previous State level legislation attempts to authorize this and the various method of fisheries have been prefaced by glowing terms of solicitous concern, for placing more fish in the sea for the general public welfare.

Weyerhaeuser—and I apologize for granting this accolade to only one interested party—has, of course, long been noted for its company policy of harvesting only to the profit point and forest products, then inviting open public participation in taking of timber, and Christmas trees. Facetiously intended, yes; naivete established, no.

Methods of propagation, positioning, and timing of runs all are State and Federal taxpayer financed technological development, and expertise must be utilized to its maximum for the benefit of the citizens who paid for it.

Lastly, if the *Boldt* decision has created one era that is favorable, it is a new awareness of how interrelated all user group efforts and activities are, and real progress toward consideration of equal resource access has occurred. Interestingly enough, all of our present operations are based on one concept. Our U.S. Supreme Court recently established that fish converted to property only when caught. That leaves no room in our State's waters for branded free-swimming private property.

More regulation rumbles, legislative battles, and court contests to establish special interest ownership we do not need.

I thank you again, Senator, for permitting us this opportunity here in Seattle.

Senator MAGNUSON. The State law doesn't allow it now.

Mr. SUTHERLAND. We're just doing our best to make sure it doesn't

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happen, sir, in this particular direction, and we anticipate it could have been overriding.

Senator MAGNUSON. I said the State law doesn't do it now, and we want to be very careful that we don't preempt State laws in the broad bill. That distinction is very clear, as I told Paul, and we're making that clear now. The State doesn't allow it now.

Mr. SUTHERLAND. I understand that.

Senator MAGNUSON. I used to be in the State legislature, but I'm not now.

Mr. SUTHERLAND. My anticipation is where the Federal law might.

Senator MAGNUSON. Who is next?

Ed, do you want to add anything?

Ed Manary, for the record, Washington State Charter Boat Association. Go ahead.

STATEMENT OF ED MANARY, WASHINGTON STATE CHARTER BOAT ASSOCIATION

Mr. MANARY. Members of the committee, ladies and gentlemen, my name is Ed Manary, and I'm employed by the Washington State Charter Boat Association.

Like the others, Senator, I'd like to thank you for the opportunity to appear here today, and further thank you for the interest on your part in coming to Washington State to meet with the user groups on this subject.

Here in Washington State, ocean ranching is the second most controversial issue facing the salmon industry today. It ranks second only because we still have not found the solution to the treaty Indian fishing rights problem.

In order to clarify my testimony, I would like to preface my remarks by saying that our organization is not opposed to aquaculture per se. Instead, we are concerned with those sections of the bills which would allow ocean ranching—that is, the release and recapture of salmon by private industry—for the purpose of making a profit.

On the surface, ocean ranching seems to present an honorable objective, more fish in the water. However, at second glance it becomes obvious that there are many problems connected with the ocean ranching program, and that is what I would like to discuss with you today.

In order to be brief, I will paraphrase these, Senator, with your permission.

First of all, it has been mentioned, the treaty Indian problem. How are the fish to be released, and how do they fit into the division of a catch?

Second, as Mr. Sandison has pointed out several others, we are in the midst of a massive enhancement program. The competition for water sites is supreme. The coordination of the enhancement program is a necessity.

Third, there is a great deal of speculation, as has been pointed out by Director Sandison, as to the ability to raise fish in the ocean, the open ocean. It would seem to us that it would be best that we proceed in a reasonable manner.

And fourth, which has not been mentioned today, is that all of us at this table are greatly concerned by the activities we have seen in the

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last couple of years in ocean ranching in Oregon, trying in many cases for all practical purposes, to circumvent the law for the purpose of obtaining chum eggs for the Oregon operation. It was touched on a little bit yesterday, Senator, the controversy that is fast coming between hatchery and wild fish in this State. Massive introduction by private enterprise into this area is going to precipitate that problem before we are ready for an answer.

And finally, our overriding concern is that if ocean ranching appears in this State, it is only going to be a matter of time down the road before we get to a point in the program of conflict between public and private resource. That we do not feel is in the best interest of the public resource, the producer groups, or the people of this State.

I would like to point out that the last two sessions of the State legislature, we have been able to barely overcome the efforts of private industry. If this bill is passed, as written, including ocean ranching, it is highly doubtful whether the user groups in Washington State will be able to further stall the efforts of private industry.

In closing, I would like to say we do appreciate the efforts of Congress see the needs of seafood in this country and protein needs of the world. We do not feel that the advent of ocean ranching in this State for salmon is in the best interests of any parties concerned.

Senator MAGNUSON. I see what you mean in your next to last paragraph. Unless we do something specifically in this particular bill, it might enhance the possibility of having some State legislation passed.

Mr. MANARY. I would prefer we did something to deenhance the possibility of this happening.

Senator MAGNUSON. I left a few things on the burner.

All right. What about Mr. Heckman, is he here?

STATEMENT OF JIM HECKMAN, NORTHWEST INDIAN FISHERIES COMMISSION

Mr. HECKMAN. Thank you, Senator. I'll try to make this quick, and give another speaker a chance to get on before you leave.

Like the others, Northwest Indian Fisheries Commission is a party to the telegram requesting this hearing, and we want to thank you for taking these special efforts and making yourself available today.

I am James L. Heckman, executive director of Northwest Indian Fisheries Commission, speaking in behalf of the commission and its 19 member tribes. The Columbia River Intertribal Fish Commission also concurs in this testimony.

The intention of H.R. 9370 is to establish and implement a national aquaculture policy and to encourage increased aquaculture development. The tribes support the general intent of this aquaculture legislation. They feel it is important——

Senator MAGNUSON. I can understand that, they have been engaged in it for some time.

Mr. HECKMAN. They feel it is important that the purpose of the bill——

Senator MAGNUSON. And I help them to get funds once in a while.

Mr. HECKMAN. I'm aware of that, and they are appreciated and they benefit everybody.

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They feel, the tribes feel, that it's important that the purpose of the bill be amended to show that it will not alter existing fisheries and Indian treaty fishing rights. The tribes feel that ocean ranching, a form of aquaculture, for salmon and steelhead by governmental agencies, should be encouraged and permitted where the profits for such ventures are reinvested into the management of fisheries.

Precautions should be taken to insure that private ocean ranching will not adversely affect public production and harvest schemes established through comprehensive planning by Federal, State, and tribal governments. Private ventures should not be allowed which preempt selection of project sites and development by governmental entities, including tribes.

We note that section 5 of H.R. 9370 provides for the selling of seed stock by the Federal Government to private industry whenever private industry is otherwise unable to obtain seed stock. This is of great concern to the tribes.

In relation to salmon and steelhead, paragraph (A)(3) should be amended to say that "such sale will take place only after review by and in accordance with a plan that should include priority use of the egg supplies by the tribes and the State."

Since tribal governments have been recognized as having special treaty fishing rights which must be protected——

Senator MAGNUSON. Now, this section applies to seed stocks of all species. It isn't just salmon. It relates to shellfish, catfish, anything you say, it's all seed stock. We'll talk about making exemptions to it, but I wouldn't want to take that out. You want to eat some catfish once in a while, don't you?

Mr. HECKMAN. Obviously, the bulk of the people, those seated at the table, are concerned about salmon and steelhead, and this is what we're referring to mostly.

Since tribal governments have been recognized as having special treaty fishing rights which must be protected as a matter of law, the following changes to insure such recognition and status are suggested:

Section 4(a)——

Senator MAGNUSON. We will take a look at these suggested changes. We'll put them in the record, and I'll take a look at them.

Mr. HECKMAN. I didn't intend to read each one of them.

Senator MAGNUSON. All right.

Mr. HECKMAN. Except to note——

Senator MAGNUSON. I appreciate that. That's why we're having this hearing, to get suggestions.

Mr. HECKMAN. I just have three of them.

Senator MAGNUSON. Well, go ahead.

Mr. HECKMAN. Section 4(a)(1)——

Senator MAGNUSON. I can come back this afternoon, if you want me to.

Mr. HECKMAN. This will be brief. It provides for consultation with numerous governmental agencies. This section is deficient in that it does not provide for consultation with recognized Indian tribal governments which also have significant functions related to aquaculture, and I've suggested the language to you in my written statement.

Section 4(f)(1) of the act provides for consultation for the development of aquaculture development programs. For the same reasons

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as above, federally recognized Indian tribal governments should be consulted in such development, and I suggest that in my testimony, the language.

The third one, section 7(a), provides for grants and contracting to certain entities. This section, as drafted, does not allow for direct grants or contracts to Indian tribes but appears to provide that such grants or contracts would have to be approved by a State government. Since Indians have independent functions to carry out with regard to fisheries matters, direct grants or contracts with such tribal governments should be allowed, and I've provided you with suggested language to change that.

And that's it, Senator. I want to thank you.

Senator MAGNUSON. That is 7(a)?

Mr. HECKMAN. Yes.

Senator MAGNUSON. And you said to add "any affected federally recognized Indian tribal government?"

Mr. HECKMAN. That's correct. And again I want to thank you.

Senator MAGNUSON. Thank you.

[The changes referred to follow:]

(1) Section 4(a)(1) provides for consultation with numerous governmental agencies. This section is deficient in that it does not provide for consultation with recognized Indian tribal governments which also have significant functions related to aquaculture.

Suggested language:

Amend S.4(a)(1) (at page 7) to read as follows:

Before the close of the one-year period beginning on the effective date of this Act, the Secretary, after consultation with the Secretary of the Interior, the Secretary of Agriculture, and the Chief Executive Officer of any other federal agency, any appropriate Regional Fishery Management Council established under S. 302 of the Fisheries Conservation and Management Act of 1976, *any affected federally-recognized Indian tribal government*, and any state agency which has significant functions which relate to aquaculture, shall by regulation * * *

(New language italicized.)

(2) Section 4(f)(1) of the Act provides for consultation for the development of aquaculture development programs. For the same reasons as above, federally recognized Indian tribal governments should be consulted in such development.

Suggested language:

Amend S.4(f)(1) to read as follows:

The Secretary, in consultation with the Secretary of the Interior, the Secretary of Agriculture, and the Chief Executive Officer of any other Federal agency, any appropriate Regional Fishery Management Council, *any affected federally-recognized Indian tribal government*, and any state agency which has significant functions which relate to aquaculture, shall review on an annual basis * * *

(New language italicized.)

(3) Section 7(a) provides for grants and contracting to certain entities. This section, as drafted, does not allow for direct grants or contracts to Indian Tribes but appears to provide that such grants or contracts would have to be approved by a State government. Since Tribes have independent functions to carry out with regard to fisheries matters, direct grants or contracts with such tribal governments should be allowed.

Suggested language:

Amend S.7(a) to read as follows:

The Secretary * * * may carry out any function relating to any aquaculture development program which he is specified to implement under the plan, through grants to, or contracts with, any other Federal agency, *any affected federally-recognized Indian tribal government*, any agency of any State and, subject to the approval of the State, any agency of any political subdivision thereof, any regional commission, and educational institution, or any other person.

(New language italicized.)

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Thank you for the opportunity to testify on this very significant legislation affecting the valuable fisheries of the Pacific Northwest.

Senator MAGNUSON. Our next witness is Mr. Chuck Judkins. Is he here?

STATEMENT OF CHUCK JUDKINS, PRESIDENT, NORTHWEST STEELHEAD AND SALMON COUNCIL

Mr. JUDKINS. Thank you. My name is Chuck Judkins. I'm president of the Northwest Steelhead and Salmon Council, and I'm here speaking on their behalf today, and I'm speaking primarily for salmon and steelhead.

The Northwest Steelhead and Salmon Council oppose legislation that would allow ocean ranching for the following reasons:

Enhancement of another user group until final settlement of the controversy surrounding the *Boldt* decision.

Two, the increased competition with existing native and resident stocks in the streams during spawning.

Three, the rearing area at sea belongs to us all, along with the food source, should not be used for rearing private stock.

And four, the possibility of spread of disease could destroy existing stocks.

And five, it is a harvest problem. As area closures reduce limits, reduce seasons, and so on.

And six, possibility of mixed stock interception.

In conclusion, we oppose at this time any legislation that would allow acquaculture ocean ranching prior to full settlement of the *Boldt* controversy, and until such time as our objections are answered.

Thank you.

Senator MAGNUSON. You're talking about steelhead and salmon?

Mr. JUDKINS. Right.

Senator MAGNUSON. Off the record.

[Discussion off the record.]

Senator MAGNUSON. All right. Mr. Marincovich?

STATEMENT OF CLEMENT ADY, THE COLUMBIA RIVER FISHERMEN'S PROTECTIVE UNION

Mr. ADY. My name is Clement Ady. I'm representing Mr. Marincovich.

All the views have been expressed by the fishermen today, and I see no need to continue. I would like to point out the Columbia River, the unique position that we have both Oregon and Washington fishermen involved, and we're involved in a compact situation, since Oregon has——

Senator MAGNUSON. When you have two different laws, it does make it difficult.

Mr. ADY. The Washington fishermen are the ones that suffer when Oregon votes to shut down fishing times so that they can gather enough eggs to supply Oregon operatives so that it affords their functions which amount to millions of eggs and at the same time the State of

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Washington supplies to Oregon Aqua-Foods, an Oregon corporation, millions of eggs to promote their private industry, so Washington suffers even though they don't have an aquaculture bill.

There should be something done about either preventing the sale of Washington eggs to Oregon corporations for the production of seafood or maybe we need in Oregon to prevent aquaculture from being private enterprise.

The Columbia River suffers under the same type of legal decision under the Malone Act although it was a settlement rather than a judicial order. We have a greater problem in that we have dams upon the river, hundreds if you count all the tributaries, and we have the Idaho difficulties, but the Columbia River is important to Washington fishermen, and that is a depressed enterprise there.

Senator MAGNUSON. All right. Thank you.

Ed Rydman. He's not here.

Steve Mathews.

STATEMENT OF STEVE MATHEWS, WASHINGTON TROLLERS ASSOCIATION

Mr. MATHEWS. Thank you.

Your committee is devoting a lot of time lately to fisheries matters and the industry is grateful.

I am Stephen B. Mathews. I'm speaking for the Washington Trollers Association. I'll summarize my remarks, since I think a lot of them will be repetitive.

The trollers' main concern is, I believe in addition to the quality aspect and egg sales problems mentioned is the likelihood, or the perceived likelihood of ocean ranching firms becoming so large as to be able to bend the political system to reduce ocean harvest rates. They would pressure the States or the council to reduce the harvest rates and get more fish back inside.

I'm quite familiar with recent returning rates on salmon hatchery production. Considering the fish that get back to the hatchery, I don't think there's much profit potential right now because of the high intensity fisheries that we have in our hatchery stocks. Since the *Boldt* and *Belloni* decisions the fishing pressure is becoming intensified, and the agencies are just getting enough back for the eggs.

The only way an ocean rancher can make a profit it seems is to improve the survivability of the stock which is, of course, a hopeful but problematical end point, and two, somehow manage to reduce the harvest rates in existing fisheries. This latter point is the major concern.

I don't want to be totally negative on private ocean ranching. Although this may not be the opinion of all trollers, I think there may be some place in the scheme for private salmon ocean ranching and perhaps Federal legislation should fairly clearly address this question.

Ocean ranching could, for example, be limited to small scale family farming type operations whereby no firm would be large enough to politically bend the existing management allocations system. Here I'm speaking perhaps of the larger firms—potentials may exist for cooperative arrangements between private ocean ranchers and Indian tribes or between ocean ranchers and commercial fishery groups.

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In such arrangements, the cooperative entities would share the costs as well as the benefits. Enabling charters would explicitly insure that the benefits would accrue to both the private investors and the fishermen in some fair and equitable apportionment, so that neither could achieve or want to achieve a political edge in catch distribution of the other.

I urge you to consider how Federal legislation could perhaps be worded or amended to allow limited opportunities for private investment in ocean ranching without creating—clearly, this is the major concern of the Trollers Association—the opportunity to transfer a public resource with benefits reaped by the public at large to a private one with benefits being reaped primarily by the few.

Senator MAGNUSON. Thank you very much.

[The statement follows:]

STATEMENT OF STEPHEN B. MATHEWS

I am Stephen B. Mathews, Associate Professor of Fisheries at the University of Washington. My home address is 2403—25th East, Seattle, Washington. I own a commercial salmon troller which I operate in the summer non-teaching months. I am a member of the Washington Trollers Association and am testifying for that organization.

Your committee is devoting a great deal of time lately to fishery matters, and the salmon fishing industry is grateful for your concern.

As a fishery professor, I am aware of and excited about the tremendous potential of aquaculture to create new food products, new jobs, new technology and improved biological understanding. At the same time I am concerned that the living marine resources in our public waters remain as common property resources and not fall into private ownership. I am referring primarily to private ocean ranching for salmon and other anadromous species.

The profit making potential of private ocean ranching of salmon is very great. Our public hatcheries are currently yielding benefit: cost ratios of 3:1. What other business opportunities offer the likelihood of returning $3 of revenue for every dollar spent? This favorable potential has attracted the interest and with it substantial investments by private companies and, in Alaska, fishermen's cooperatives.

However, since such high fractions of the salmon are presently being caught in existing salmon fisheries, private ocean ranching can expect a profit only by improving technology to increase survival, which is a hopeful but problematical endpoint, or by pressuring the councils and state agencies to reduce present harvest rates. It is the latter possibility which concerns the salmon industry. For example, one ocean ranching firm is attempting to place a representative on the Pacific Regional Council.

The addition of private ocean ranchers intensifies the salmon allocation squeeze. It has only been with extreme difficulty that we are beginning to make progress in solving the allocation problems among the historical users created by the Boldt and Belloni decisions. Another player in the game—the ocean rancher—makes the shoe fit tighter.

There are no guarantees that private ocean ranching can or will enhance the salmon cheaper or more efficiently than the public hatchery systems. I have seen no evidence that salmon reared in private hatcheries are a better product than those from federal and state hatcheries. I continue to be vastly impressed with the public hatchery programs in California, Oregon and Washington. These have doubled chinook and coho salmon catches over the past 20 years in face of declining environmental quality. From such an outstanding record do we need to turn to private ocean ranching for the future? Washington State has a new, massive enhancement program funded from licenses and other user fees, and the federal government plans on adding more to offset the burden to non-Indian fisheries of the recent Indian fishery rights decisions.

Will our coastal waters be productive enough for public enhancement programs—intended for common benefit—as well as private enhancement efforts for corporate benefit?

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If there is a place for private salmon ocean ranching, this should be very clearly spelled out in any federal legislation. Ocean ranching could be limited to small scale "family farm" types of operation, whereby no firm would be large enough to politically bend the existing management-allocation system. Also, potentials may exist for cooperative arrangements between private ocean ranchers and Indian tribes, or between ocean ranchers and commercial fishery groups. In such arrangements the cooperating entities would share the costs as well as the benefits. The enabling charters would explicitly ensure that benefits would accrue to both the private investors and the fishermen in some fair and equitable apportionment, and that neither could achieve or would want to achieve a political edge in catch distribution over the other.

I urge you to consider how federal legislation could be worded or amended to allow limited opportunities for private investment in ocean ranching, without creating the opportunity to transfer a public resource with benefits reaped by the public-at-large to a private one with the benefits being reaped by the few.

Senator MAGNUSON. Thank you all. I notice one statement here that I feel kind of good about. Public hatcheries' programs in California, Oregon, and Washington have doubled chinook and coho salmon hatches in the past 20 years

Mr. MATHEWS. That's one thing we overlook. We're always knocking Federal expenditures of money, but this is one industry that it's very clearly paid off highly.

Senator MAGNUSON. It's suggested I get a dollar value for a dollar spent.

Mr. MATHEWS. You get more than a dollar value; you get $3.

Senator MAGNUSON. That's a good investment.

Thank you all very much. I appreciate it, and I'm sorry I do have to run. I'd like to discuss it further, but I think you've made your point as far as the testimony is concerned. Thank you all very much.

[Whereupon, at 11:45 a.m., the hearing was adjourned.]

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U.S. DEPARTMENT OF COMMERCE.
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION,
NATIONAL MARINE FISHERIES SERVICE,
Washington, D.C., May 12, 1978.

Hon. DANIEL K. INOUYE,
U.S. Senate,
Washington, D.C.

DEAR SENATOR INOUYE: This responds to your request of April 17, 1978, to Senator Warren G. Magnuson, Chairman of the Senate Committee on Appropriations, for answers by the Department of Commerce to certain questions relating to aquaculture. It also responds to a request made by telephone by Dr. John Belshe of your staff for a summary of grant and loan programs administered by the Department of Commerce to indicate the organization in the Department already established to handle such programs.

Question 1. Would you please enumerate the most important species of finfish and shellfish to the aquaculture industry, and indicate if their rearing is in fresh, brackish or saltwater.

Answer. See below:

MAJOR SPECIES RAISED BY AQUACULTURE IN THE UNITED STATES

Species	Metric tons	Percent	Pounds
Marine, estuarine, and anadromous:			
Salmon (public)	27,000	34.8	59,400,000
Salmon (private)	450	.6	990,000
Oysters	9,070	11.6	19,954,000
Clams	1,180	1.5	2,596,000
Shrimp (marine)	200	.2	440,000
Shrimp (macrobrachium)	2		4,400
Subtotal	37,902	48.7	83,384,400
Freshwater:			
Trout	13,600	17.5	29,920,000
Catfish	21,800	28.0	47,960,000
Crawfish	4,500	5.8	9,900,000
Subtotal	39,900	51.3	87,780,000
Total	77,802	100.0	171,164,400

Source: Data from the NOAA Aquaculture Plan, 1977.

Question 1a. Which of these species is being researched or investigated by the Department of Commerce exclusive of the Sea Grant Program, and by what office or laboratory?

Answer. National Marine Fisheries Service Laboratories Performing Aquaculture Research, and Species Under Study

Salmon.—Manchester, Washington; Seattle, Washington; Auke Bay, Alaska; and Portland, Oregon.

Oysters and Clams.—Milford, Connecticut.

Shrimp.—Galveston, Texas and College Park, Maryland (Charleston, South Carolina).

Catfish.—Little Rock, Arkansas (marketing) and St. Petersburg, Florida (contract with Dept. of Interior).

Question 1b. Which of these species is being researched or investigated under a Sea Grant Program, and at what institution?

Answer. Sea Grant Program on Aquaculture—category and institution.

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CRUSTACEANS

Lobsters.—University of Maine/University of New Hampshire, Woods Hole Oceanographic Institution, University of California.

Marine shrimp.—Texas A&M; University of Houston; University of Arizona; and Groton Associates.

Giant prawns (Macrobrachium).—Hawaii Department of Land and Natural Resources; Auburn University; Rutgers University; Clemson University; South Carolina Marine Resources Research Institute; and University of Hawaii.

Crayfish.—Louisiana State University.

FINFISH

Salmon.—University of Washington; Oregon State University; University of Alaska; University of California; University of Maine/University of New Hampshire; University of Rhode Island; and University of Idaho.

Eels.—University of North Carolina.

Yellow perch and walleyes.—University of Wisconsin Cornell University.

Fish (other).—University of Minnesota Oceanic Institute.

MOLLUSKS

Mussels.—University of Maine/University of New Hampshire.

Oysters.—University of Maine/University of New Hampshire; University of Washington; University of Delaware; Woods Hole Oceanographic Institution; University of Maryland; Virginia Institute of Marine Science; Oregon State University; and George Mason University.

Clams.—University of Washington and Woods Hole Oceanographic Institution.

Rock scallops.—University of California.

Abalones.—University of California.

OTHER SPECIES

Bullfrogs.—Louisiana State University.

Seaweeds.—University of California; University of Washington; University of Hawaii; California Institute of Technology; University of Florida; University of Maine; University of Delaware; University of Maine/University of New Hampshire; and University of Rhode Island.

OTHER PROGRAMS

Thermal effluents.—University of California.

Artificial upwelling of the sea.—University of Texas.

Production and marketing.—Oregon State University.

Pathology and disease.—University of North Carolina; Louisiana State University; University of Rhode Island; State University of New York; University of California; and Oregon State University.

Economics.—Texas A&M; University of Hawaii; University of Delaware; and Clemson University.

Law.—University of California.

Engineering.—Texas A&M; University of Hawaii; and University of Delaware.

Seafood technology.—University of Washington and University of Rhode Island.

Waste water utilization.—Woods Hole Oceanographic Institution.

Pollution.—University of Wisconsin.

Environmental modeling.—University of Wisconsin.

Course development.—University of Alaska and State University of New York.

Information (bibliography).—Virginia Institute of Marine Science.

Extension (Marine Advisory Services).—University of Alaska; University of Washington; University of Maine; University of New Hampshire; Oregon State University; University of Florida; University of California; Texas A&M; University of Wisconsin; and Hawaii Department of Land and Natural Resources.

Question 2. Does NOAA have any mandate to support freshwater biological program, and does it have any employees so engaged?

Answer. Following is a partial listing of legislative authorizations which generally or specifically authorized freshwater aquaculture activities of the National Marine Fisheries Service and Office of Sea Grant.

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(1) (NMFS) Joint Resolution N-. 22, 41st Congress-Original Act of February 9, 1871, Office of Commissioner of Fish and Fisheries Established-Propagation of Food Fishes and Investigations to Ameliorate Predator Damage. 16 USC 744–745.

(2) (NMFS) Public Law 203–Act of April 28, 1922, Propagation of Mussels. 16 USC 750–751.

(3) (NMFS) Public Law 502–Original Act of May 11, 1938, Columbia River Basin Fishery Development Program (Mitchell Act). 16 USC 755–757.

(4) (NMFS) Public Law 1024–Original Act of August 8, 1956, Fish and Wildlife Act of 1956. 16 USC 742a–742k.

(5) (NMFS) Public Law 85–342–Act of March 15, 1958, Fishery Research and Experimentation (Reservoirs and Flooded Rice Lands). 16 USC 778–778c.

(6) (OSG) Public Law 89–688 Act of October 15, 1966, National Sea Grant College and Program Act of 1966. 33 USC 1121–1124.

NOAA ACTIVITES IN FRESHWATER AQUACULTURE

Catfish

(1) Little Rock, Arkansas, Marketing and Statistical Office.

(2) Contract to Fish and Wildlife Service of the Dept. of the Interior to conduct biological research and water quality research ($157,000 per year since 1972.)

Crayfish

(1) Sea Grant support of project at Louisiana State University

Yellow perch and walleyes

(1) Sea Grant support of project at University of Wisconsin

(2) Sea Grant support of project at Cornell University

Bullfrogs

(1) Sea Grant support of project at Louisiana State University.

Question 3. Could the Department of Commerce cite any loan programs, or similar financial support, for small business which it administers and which might be suitable for family for types of aquaculture enterprises.

Answer. The Department of Commerce administers a considerable number of loan and financial aid programs, which are summarized briefly below. Most of these are not applicable directly to support family type aquaculture enterprises. However, this array of programs illustrates the existence of a large and well established infrastructure in the Department of administering financial aid programs.

National Marine Fisheries Service

(1) *Long-term Debt Capital.*—The Fishing Vessel Obligation Guarantee program (under Title XI of the Merchant Marine Act, 1936) guarantees private capital financing up to 87½ percent (for up to 20 years) of the cost of constructing, reconstructing, or reconditioning fishing vessels. All financial and economic feasibility analysis, as well as loan closing and servicing, is done by NMFS (which also serves as mortgagee). Private sector lenders serve as a capital conduit. No appropriated funds are involved in NMFS administration of this program (both are funded by guaranteed obligors' user fees.) The program's statutory authority is in all essential respects the same mechanism as the guarantee provisions of the aquaculture bill. The Fishing Vessel Obligation Guarantee program mainly finances small, independent, owner/operators.

(2) *Equity Capital.*—The Fishing Vessel Capital Construction Fund program (under Section 607 of the Merchant Marine Act, 1936) defers Federal taxation of fishing vessel income when that income is, under agreement with the Government, reserved for future vessel construction or reconstruction. Deferred taxes are recaptured through reduction in the basis for depreciation of vessels acquired with tax deferred funds.

(3) *Intermediate-term Debt Capital.*—The Fisheries Loan Fund (Section 4 of the Fish and Wildlife Act of 1956) makes direct Federal loans for purchasing, constructing, repairing, equipping, maintaining, or operating new or used fishing vessels or gear. This program mainly finances small, independent, owner/operators. This program is presently under administrative moratorium and about a dozen bills now before Congress would revise and reauthorize it.

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(4) *Short-term Debt Capital.*—The Fisheries Gear Damage Compensation Fund (Section 10 of the Fishermen's Protective Act of 1967) makes direct Federal loans for the replacement or repair of fishing gear lost, damaged, or destroyed by foreign fishing vessels in the Fishery Conservation Zone.

(5) *Casualty Insurance.*—The Fishermen's Guaranty Fund program (authorized by Section 7 of the Fishermen's Protective Act of 1967) indemnifies against certain costs and losses resulting for the seizure of domestic fishing vessels by foreign vessels by foreign governments (loss of income; damage, destruction, or confiscation of vessels or gear; spoilage or confiscation of fish; and other incidental costs or losses). Program funded by user premiums.

Programs (1), (2) and (3) above are mainly used by small, independent, owner/operators and programs similar to them would be suitable for family types of acquaculture enterprises.

Economic Development Administration

(1) Grants and Loans for Public Works. This program was authorized by the Public Works and Economic Development Act of 1965 as amended. The basic goal is to assist in the construction of public facilities needed to initiate and encourage long-term economic growth in designated areas where the economic growth is lagging. State and local governments, Indian tribes and private and public nonprofit organizations may apply for grants or loans. FY 77 grants and loans amounted to $145 million.

(2) Business Development Assistance. This program was authorized by the Public Works and Economic Development Act of 1965 as amended. The purpose of the program is to encourage industrial and commercial development in designated high unemployment areas by providing financial assistance to business for the creation of permanent jobs. During FY 77, Direct loans and Guaranteed loans totaled $41 million.

(3) Public Works Impact Projects. This program was authorized by the Public Works and Economic Development Act of 1965 as amended. The purpose of the program is to construct public facilities to provide immediate jobs to the unemployed in the project area. The program is joint funded with the local jurisdiction in most cases. During FY 77, $22 million was allocated to this program.

(4) Economic Adjustment Assistance. This program was authorized by the Public Works and Economic Development Act of 1965. The goal of the program is to provide special programs to help state and local areas meet special problems arising from actual or threatened unemployment as a result of severe changes in economic conditions. During FY 77, grants totaling $92 million were issued

(5) Trade Adjustment Assistance.—This program was authorized by Title II of the Trade Act of 1974. The goal is to provide adjustment assistance to firms and communities adversely affected by increased imports. The program provides both direct and Guaranteed loans to eligible firms or communities. During FY 77, $35 milion in assistance was given.

Office of Coastal Zone Management

(1) Coastal Zone Management Program Development.—This program is authorized by the Coastal Zone Management Act of 1972 as amended. This program provides grants to states for assistance in the development of a management program for the land and water resources of its Coastal Zone. FY 77 grants awarded were $10.4 million.

(2) Coastal Zone Management Program Administration.—This program was authorized by the Coastal Zone Management Act of 1972. The objective of this program is to provide grants to states, which have developed acceptable Coastal Zone management plans, the funds to implement and administer the plans. The FY 77 grants were $8.8 million.

(3) Coastal Zone Energy Impact Fund.—This program was authorized by the Coastal Zone Management Act amendments of 1976. The goal of this program is to provide loans, loan guarantees and grants for projects which are required as a result of energy exploitation in the Coastal Zone. The program was just beginning in 1977 and therefore data are not available.

Maritime Administration

(1) Construction Differential Subsidies.—This program is authorized under Title V of the Merchant Marine Act of 1936 as amended. The goal of the program is to provide subsidies (grants) to private operators of certain types of merchant vessels to make up the difference between domestic shipbuilding cost and costs of construction at foreign yards. During FY 77, $264.8 million was slated for ODS contracts.

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(2) Federal Ship Financing Guarantees.—This program is authorized by Title XI of the Merchant Marine Act of 1936 as amended. The purpose of the program is to promote construction of U.S. flag vessels by providing guarantees of construction and permanent financing to make credit more readily available. During FY 77, outstanding guarantees available were $6.6 billion.

(3) Operating Differential Subsidies.—This program was authorized by Title VI of the Merchant Marine Act of 1936 as amended. The goal of this program is to provide subsidies to operators of certain merchant vessels along certain shipping routes to offset the differential in operating costs between U.S. and foreign flag vessels. During FY 77, there was $388 million involved with this program.

Office of Minority Business Enterprises

Minority Business Assistance.—This program was authorized by Title III of the Public Works and Economic Development Act of 1965 as amended. The goal of the program is to promote and assist the expansion of minority enterprise in the U.S. Assistance includes project grants and contracts are made available to private organizations to promote this goal. Contracts and grants in FY 77 totaled $48 million.

U.S. Travel Service

This program was authorized by the International Travel Act. The goal of the program is to encourage foreign residents to visit the U.S. Matching grants are available for development of area special travel programs. During FY 77, $.9 million was involved with this program.

Summary

The Department of Commerce as a whole administered $7.6759 billion in assistance programs during FY 77. Additionally there are several programs which involve owner-operator funds such as insurance schemes or tax deferral programs which provide an additional $1 billion in assistance.

Sincerely,

_____,

(For TERRY L. LEITZELL, *Assistant Administrator for Fisheries*).

ROUTE 4, BOX 152,
Coos Bay, Oreg.

Hon. WARREN G. MAGNUSON,
Senate Committee on Commerce, Science & Transportation, Russell Senate Office Bldg., Washington, D.C.

DEAR SENATE MAGNUSON: The purpose of this letter is to enter testimony on H.R. 9370, the new aquaculture bill being considered by the Senate.

I am an individual, not a large corporation. I live on a 22 acre farm on a branch of the Coos Bay estuary called Cateleing Slough. I have applied for and received a permit for a drum salmon hatchery at my place. I have developed the water supply and have hatched and released experimental quantities of salmon from my site for the past 2 years. I am on the salmon egg allocation list of the Oregon Department of Fish and Wildlife, and it looks like it could be an 8 or 10 year wait for egg stocks to start my program unless something other than the present program is done.

H.R. 9370 is needed by the small private hatchery owners in Oregon. Please do what you can to help us get our programs going and strengthen the fishery resources of the Oregon coast.

Please forward to me the most recently revised copy of H.R. 9370.

Very truly yours,

CALVIN W. HECKARD.

ALL COAST FISHERMENS MARKETING ASSOCIATION, INC.,
Charleston, Oreg.

Senator WARREN G. MAGNUSON,
Oversight Hearings—P.L. 94 265,
Joint Venture/Aquaculture.

HONORABLE SIR: I was unable to testify today because of a time problem. The issues under discussion are of great importance to me and the men and women of my organization. All Coast Fishermens Marketing Assn., Inc. of Charleston, Oregon.

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P.L. 94-265—Fishery Conservation & Mgmnt. Act.

Since the majority of my constituents—approx. 575 commercial fishing vessel owners of Oregon, are salmon fishermen, I speak to this issue with concern.

The Pacific Fishery Management Council is clearly having difficulty with the language of the Act., to wit: Salmon "hall manage, where practicable, through its range; fair and equitable allocation of impact; etc..

With one working fisherman at Council, and lately defined council jurisdiction from 3 to 200 miles and *not* inside three miles, Chairman McKean's concern for wild salmon, while commendable, is beyond the scope of council jurisdiction clearly, and yet it is this attitude of inside involvement that creates much of the confusion. *State* jurisdiction addresses wildfish via habitat enhancement . . . it is *not* Council's concern just as it is not their concern on treaty tribe allocation inside 3 miles.

The Act suggests that there will be fair and equitable allocation of impact to all users, and yet U.S. fishermen above Tillamook Head in Ore. thru to the Canadian Border must take *only* 28" chinoor, while right across the border, Canadian may take 26" chinoot from the identical run. While U.S. fishermen are being cut back, the State Dept. proposes an increase of Canadian salmon fishing privileges despite language in the Act which says "there is no foreign allocation of salmon."

With *one* working fisherman at Council, representation is difficult. The Eastland Resolution recommended a cooperative management relationship of 50% fishermen. This has been largely ignored much to the sorrow of the U.S. industry in Oregon who saw the E.R. findings as a guidepost to mark the way for what was hoped to be the future of U.S. Fishery Policy. We earnestly entreat you to resolve the ambiguous language in the Act and bring a fair re-apportionment to the voting balance of the Council. We would be pleased to assit however possible.

JOINT VENTURE

The U.S. has claimed territory offshore outward to 200 miles and the resources that lie therein. The U.S. processor must be in a priority access status. However, failing this, the U.S. fleet must be allowed to fish these stocks first—be it through Joint Venture or however.

AQUACULTURE

The involvement of multinational corporations could spell the end of the highly intensive (Labor) U.S. Salmon fleet. Checks and balances insuring that this does not come to pass must be implemented to guarantee the survival of the high seas salmon fleet.

Just as in Joint Venture—the comparatively small U.S. processors ask protection and priority claim on whiting stocks—the U.S. salmon fleet asks priority claim on the salmon of the Pacific Coast over the huge conglomerates that signify intent to get involved.

I apologize for the rough and hasty nature of this presentation, but there was not time for me to testify June 5th. Thank you for your time and concern.

Very respectfully,

BOB HUDSON,
General Manager.

THE POGGIE CLUB OF WASHINGTON,
Seattle, Wash., June 7, 1978.

Senator WARREN G. MAGNUSON,
U.S. Senate Commerce Committee, U.S. Senate,
Senate Office Building, Washington, D.C.

DEAR SENATOR MAGNUSON: We send you these three copies of this letter and ask you to include it as part of the public participation in the acquaculture bills public hearing conducted yesterday here in the U.S. Courthouse.

We question all three of these bills and ask you to remove, delete, salmon as included in or affected by any or all of them. We are opposed to the opportunity these offer for bigger industries to do with the fisheries resource that they have done with timer and other resources—monopolize it for private profit of a few rather than most public good—often to export it abroad—logs, fish other.

We have as an infant program capable of great growth our $90,000,000 salmon enhancement program for this state as an estimated cost of $30,000,000 for the

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project—and another $60,000,000 as bond interest. This will be paid for by sportsmen who number 600,000 in Washington—most of whom are registered voters—and 2,000 major commercial fishermen.

We do not think a new plan to guarantee major resource-using industries against every loss of every kind either is needed or would be compatible with resource sharing we now have or are working to achieve. To add these aquaculture bills will simply add to the injustice and citizen inequality provided by the Boldt decision, naming John Tanner as federal judge, and more.

We ask you to note, too, that the only sports fishing representative heard yesterday by you speaks for a group termed a "steelhead-salmon council" of 27 chapters but two of which are predominantly salmon anglers and which as a totality number between 2,000 and 2,400 total membership—against the half-million-plus salmon fishermen who were not included and not given time to testify during your brief 90-minute hearing on this multi-million-dollar thing which so greatly affects us all.

We as the Seattle Poggie Club, Senator Magnuson, will note our 50th birthday in a moment of time. The salmon are a major state economic asset and tourist magnet. Salmon value as a sports fish varies from four-to-one to seven-to-one more than as a commercial taken fish. To permit commercial industrial salmon raising of fish which will not take commercial or sports hooks and lures and open the door for such operators and their political influence out of proportion to their numbers or public service is unthinkable.

These aquaculture bills and the $500,000,000 fund to be publicly provided can only be termed by some as "Weyerhaeuser Welfare"—one more corporate profit, one more punish-the-public monopolization of a natural resource as timber companies and railroads took over our forests and public lands.

Your truly,

JAMES LONE,
Chief Poggie.

LUMMI INDIAN TRIBAL ENTERPRISES,
Marietta, Wash., June 7, 1978.

To: Senator Magnuson, Chairman, Commerce Committee.

MR. CHAIRMAN: As the manager of one of the original Indian operated ocean ranching ventures in the United States, I am very interested in the present Aquaculture bills in congress, especially as to the final statement pertaining to the ocean ranching of anadromous fish.

You have on record a written testimony from one regarding the high contribution (10–11%) of our reared fish to the Washington commercial and sport fishery. After attending the hearing yesterday in Seattle, and listening to the rather one sided testimonies from various user groups, I felt is necessary to provide further comments regarding some of the obvious advantages of ocean ranching programs to the fish as well as the fishery.

Commercial ocean ranching ventures must strive to achieve the highest possible fish survival rates possible, both in the rearing phase as well as adult survival. This means using new and different rearing and releasing schemes. I feel some of the high survival rates experienced at Lummi (some groups of Coho show survival over 20%) reflects the use of short term salt water rearing prior to their release into Lummi Bay. It is necessary for ocean ranching ventures to utilize salt water release and trap sites in order to maintain high adult return quality, thus what we have experienced at Lummi is probably somewhat appicable to other ventures.

By eliminating the downstream smolt (outmigrating young salmon) phase of the salmon's life cycle and moving the release site to a salt water location, several advantages to fish survival become apparent to me. The young hatchery reared salmon are protected during the transition to salt water rather than facing a number of predators which inhabit the river mouth and estuary feeding upon outmigrates.

Often-times, large hatchery releases of salmon temporarily exceeds the carrying capacity of a river. Hence, young salmon are forced to make the journey to the sea under less than the best conditions. If, for a number of reasons (photoperiod, flow, air pressure, size), the released fish don't rapidly migrate out of the river system, survival of both the hatchery stock as well as native anadromous and resident fish suffer tremendously. It is easy to appreciate the effect of

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releasing large yearling coho or steelhead into a system full of young salmon fry but many times it becomes rule rather than exception. Hence, salt water release makes good sense not only for hatchery survival but also for native stocks.

Managing the harvest of hatchery and wild salmon stocks is often times very difficult. Many river systems which once supported large runs of native salmon are now totally dependent upon hatchery produced fish. In many cases, it is impossible to harvest the optimum number of the numerous hatchery returns without overharvesting the declining native returning adults. Hence, over a relatively short time, the system supports only hatchery fish and we have lost another self sustaining population.

Imprinting and releasing fish from salt water sites (again an ingredient of ocean ranching) would certainly reduce, if not eliminate, this impact upon native runs. Harvest management plans would now be able to direct the fishery in such a way to harvest each stock at its optimum yield.

The question also arose at yesterday's hearings regarding the role genetics and fish stock selection would play in the ocean ranchers program. Certainly there exists a tremendous opportunity to manipulate the genetic make up of a particular fish stock to optimize size, survival and run timing. Larger fish and higher survival would benefit the commercial fishing industry as well as the ocean rancher. Changing run timing and stock selection may, for a short term, allow a greater escapement to the ranchers traps, necessary at the early stages for egg production. I do find it difficult to believe, being a past commercial fisherman myself, that when a fish stock becomes available in sufficient numbers to warrant commercial fishing interest that the appropriate gear changes and season adjustments will not quickly follow.

Another fear often expressed in opposition to the ocean ranching bill is the high competition for salmon eggs. Presently, if I am correct, the Washington Department of Fisheries dictates harvest rates necessary to catch all returning hatchery fish except what is needed for their present state programs. Since forecasting adult returns is a little better than guesswork, safety margins are built into escapement goals. Hence, many times egg surpluses are inevitable. If these surplus eggs were not sold to other rearing programs I doubt if they would be reared at all. So, we are faced with the decision either to reduce the margin for error in estimating escapement, and possibly end the reason with insufficient eggs for state programs or continue the present policy and sell the surplus eggs. I feel the answer is obvious, especially since those surplus eggs may go into an ocean ranching program, whereby the fish generated from the egg sale are released into public waters for harvest to all. Also, remember that adult migrational patterns take many fish released from present Oregon and California sites into Washington, Canada and Alaskan waters and are contributing to the area's commercial fishery.

An often expressed view regarding ocean ranched fish regards their poor quality. Let me assure you that adult salmon trapped at salt water sites are of highest quality ever returning to Puget Sound locations. An added advantage of this trapping method is the option left to the rancher whether or not he wishes to market the fish or hold it for spawning about one month later. This option is not available to typical freshwater hatchery locations or the commercial fishing industry.

Finally, the problem of overtaxing the ocean carrying capacity must be faced. I feel this is not only the problem of the would be farmer but of all agencies involved in enhancement programs. It is well past the time to begin developing technique to measure and quantify the various parameters affecting carrying capacity, cyclic survival, and foreign fishing impact.

I thank you for this opportunity to express my feelings regarding the salmon industry.

Sincerely,

STEVE SEYMOUR,
Fishery Manager.

SWECKER SALMON FARM.
Rochester, Wash., June 10, 1978.

Hon. WARREN G. MAGNUSON,
Russell Senate Office Bldg., Washington, D.C.

DEAR MR. JOHNSON: Thank you for meeting with us on Thursday, June 8 in Seattle. In this letter we will summarize our position regarding National Aquaculture Legislation and salmon ocean ranching.

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Opposition to ocean ranching.—Current opposition to ocean ranching by commercial fishermen is based primarily on fear of large corporate involvement and their eventual domination of the salmon resource. Legislation being considered by the Washington State Legislature, which we and the American Salmon Growers Association support, limits corporations and individuals to one site and one permit. This would give small growers equal access to sites and ample opportunity to develop ocean ranching ventures without fear of domination by large corporations.

Washington's refusal to permit ocean ranching simply penalizes the small grower who can't afford to move to other states and countries for their releases. Corporations such as Weyerhaeuser and Union Carbide have located in Oregon and Chile and are exploring alternatives in Alaska and Canada.

National aquaculture legislation.—It is imperative that salmon ocean ranching not be singled out as exempt from programs proposed by this legislation. If excluded from national legislation, our efforts to work through our state legislature on ocean ranching would be crippled. In addition, should ocean ranching ever pass, National Legislation would benefit small growers who could then afford to construct the more expensive facilities required to rear Chinook and Coho salmon. Rearing these species would in turn enhance the commercial and sports fisheries. Without such legislation small growers would be limited to Chum Salmon which are less expensive to rear but do not contribute significantly to most sport and commercial fisheries.

Competition for eggs.—Public fisheries enhancement programs are required each year to take extra eggs and to have them available should any particular hatchery be struck by a disaster such as disease, flooding, siltation or equipment failure. Once these eggs are declared surplus, they are then sold to the private sector. Because Washington does not allow ocean ranching, most of these eggs must then be exported to other states where they are reared and released to contribute to their fisheries and their economies. Last year Washington sent over 25,000,000 eggs to Oregon. If ocean ranching were legal in Washington these eggs could be kept at home, reared, released, and would contribute to Washington's fishery and economy instead of competing with it.

Competition for sites, public vs. private.—The ocean ranching legislation being considered in Washington limits private release/recapture facilities to "waters within tidal influence". This means essentially right on or near saltwater. There are few if any public facilities existing or planned in this area. In addition the legislation precludes private facilities on rivers or tributaries with planned or existing public hatcheries. This effectively precludes private releases from competing with public releases.

It is to the ocean ranchers best advantage to insure that his fish avoid any competition with other fish because such competition would limit his return. The private concept is to rear fish in fresh water, preferably well water because it is disease free, then truck the fish to the release point. This allows the ocean rancher to manage the transition to saltwater and saltwater feeds, and to avoid the predators and the competative environment of the rivers and estuaries. The fish are released directly into saltwater when their migratory instinct is at its peak and when they are ready to move rapidly to the ocean pastures.

Increased difficulty in managing the resource.—Those who oppose ocean ranching maintain that private interests would unnecessarily complicate an already overburdened management system. However, the biggest problem faced in the management of the resource is the shortage of fish! The private sector is ready to bring private capital, expertise, and technology to bare on the problems of a diminishing resource. Most important, this is available through ocean ranching at no cost to the taxpayer!

We speak from experience when we say that no amount of delay will result in understanding and a change of mind by the commercial fishermen. We have been facing their opposition in the state legislature for four years and their position has only become more entranched. Fortunately many legislators are also tired of listening to their emotional and illogical arguments and waiting for them to realize that ocean ranching is in their own best interest. It is our hope that your decision will not exclude salmon ocean ranching from the national legislation. Ocean ranching would be in the best interest of the ocean rancher, the commercial and sports fishermen, the taxpayer, the consumer, and the state's economy!

Sincerely,

DAN AND DEBBY SWECKER.

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SIUSLAW FISHERIES,
Eugene, Oreg., 97401, June 19, 1978.

Hon. WARREN G. MAGNUSON,
Senate Committee on Commerce, Science & Transportation, Russel Senate Office Building, Washington, D.C.

DEAR SENATOR MAGNUSON: I am concerned that an essential and valid portion of the National Aquaculture Organic Act of 1978 may be eliminated because of a misunderstanding of salmon ranching and the type of business which is engaged in this form of aquaculture.

It is plain to see why you recognize Weyerhaeuser as "the salmon rancher" in our area, but I would like to introduce you and your committee members to the ten other individual private salmon hatchery permit holders.

The #1 permit issued in the state is held by two long time Oregon commercial fishermen and their partner who is a lawyer. As fishermen they realized something had to be done to supplement the diminishing stocks of salmon. They have been in operation for six years with a permit to eventually release 5 million chum salmon fry.

The #2 salmon hatchery permit is actively run by two energetic young men whose only previous salmon experience had been as dedicated recreational fishermen. One, a partner in a record distribution company, the other, a timber cruiser for a small lumber company, have spent their time and money for the past six years to prove that salmon can be harvested more efficiently than expensive troll caught salmon. After a severe drought in 1976 and untimely flooding the following year, they trapped and netted over 200 returning chum salmon this fall. Three and four years previously they had released these fish as fry into a stream whose natural chum salmon run had been almost totally destroyed by logging and agriculture.

They have now incorporated their hatchery operations to include a farmer with the land, water, and pumps necessary to begin a coho and chinook salmon feeding operation. This new hatchery facility, Siuslaw Fisheries, will now accommodate the rearing of over one million eggs to a smolt size salmon which are then ready to go to sea. A period that takes nature 1 to 1 and ½ years is accelerated to 3 to 6 months because of the warm well-water being utilized and high quality feed. The waste water from the hatchery, with its natural fertilizer added via the fish, is then reused to irrigate the farmer's crops.

They have consulted with the best fish culturists in the designing their hatchery, and have hired a well qualified hatchery manager to insure the success of this project.

Siuslaw Fisheries has the capacity to raise up to 5 million coho and chinook salmon, but they lack the financing to expand in this highly speculative business.

Another permit is held by a coastal resident who hopes to replenish a stream that once had been filled with salmon but is now devoid of the species. His permit allows him to release 100,000 fry into this stream in his attempt to renew the salmon run.

An engineer for Pacific NW Bell Telephone Company and his partner, a young farmer who wanted to put to good use the abundant water on his ranch, also have a permit to release 5 million chum salmon fry. They have gained the enthusiastic support of the community at the site of their proposed hatchery because of the greatly reduced state of the salmon runs which had once been the economic base of this area.

Among the other 9 permits for private salmon hatcheries are: 2 commercial fishermen; a lawyer; 2 Oregon coastal residents; a young businessman; a small corporation rearing and releasing 1 million coho salmon; a retired Washington state hatchery manager and his engineering partner who have designed an innovative water reuse system capable of raising 5 million chinook salmon; and Weyerhaeuser as Oregon Aqua Foods; and Union Carbide as Dom Sea.

Eight of the hatchery permits I have cited will only raise chum salmon. Chum, *Oncorhynchus keta*, were chosen because their once abundant Oregon runs have nearly been eliminated and because their lower quality flesh will not compete in the market place with troll caught salmon. Oregon processed 1 to 3 million pounds of chum each year between 1930 and 1955. But today the catch of chum is almost nonexistent. They have traditionally been a canning salmon, a salmon the consumer could afford to buy.

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I have lived in Oregon all of my life, I have never been able to afford the commercial fisherman's salmon which this year never dropped below $5.00 per pound. I do not consider this a legitimate protein source, it is and has been a luxury item. Salmon ranching, if successful, could make salmon as common as beef on our dinner tables—without ever competing with a higher quality ocean caught fish which the commercial fishermen must provide.

Four of these private hatcheries wil raise coho or chinook salmon in numbers which will also increase the commercial and recreational fisheries without oversupplying the market with fresh fish. Because of their maturity and readiness to spawn, salmon returning to a trapping facility will never be as high a quality as the fish caught in the ocean. Commercial fishermen can only benefit from the increased number of salmon made available to them at a hatchery's expense.

Opponents of salmon ranching site the large numbers of release as being detrimental to all salmon. Someday, we may reach and be able to establish a critical number of fish the ocean can support, but today these criticisms are unwarranted. The Japanese Islands release over 850 million chum salmon each year, with no noticeable impact on size, quality or in the numbers of returning fish. They continue to increase their percentage of returns through more efficient and effective hatchery and fishing techniques. The Russian fisheries release a similar number of salmon into the Pacific and also achieve good returns to their hatcheries and fishermen.

Our state and private hatchery releases here in Oregon will be under 200 million at some future optimistic maximum point of production. In total, all Oregon hatcheries now release less than 5 million chum salmon fry and less than 10 million chinook and coho. It is no wonder our commercial and recreational fishermen are discontent. It is, however, unfortunate they are opposing the very group and legislation which can eventually help them.

Of these 13 private hatchery permits in Oregon, all but Weyerhaeuser and Union Carbide, are operated and financed by enterprising individuals who saw a need and accepted the challenge to do something about it.

We are not a particularly avarice group of people, although we someday intend to develop a run of fish and show a profit. We are introducing salmon all along the Oregon coast in numbers nature can handle, with 5 million salmon fry released into each stream. At a predicted return of .5 percent, we will market 25,000 salmon at our maximum production. With improved hatchery techniques we may double this number of returning fish. We are, however, guaranteed 5 to 10 years of a large cash outflow with no income. None of us are independently wealthy, we all work for a living and support this dream we call a fish hatchery.

We have been very enthusiastic about H.R. 9370, we feel we qualify as pioneers in aquaculture. We have spent our time and money to develop the technology to someday ranch salmon effectively.

I cannot speak for the Oregon Department of Fish and Wildlife or for their future policy, but if anyone will keep the large corporate hatcheries from dominating legislation it will be these small private hatcherymen who have their roots in recreational and commercial fishing. Each individual permit has as much validity before the state as another and although our hatchery will only raise 5 million chum salmon fry, we will have equal voice with Weyerhaeuser's permit for 40 million chum salmon.

Someone or some agency has got to replenish our diminished salmon stocks. The state has not had the funds (even with extensive mitigation) to re-establish the salmon to former levels, so they have turned to private enterprise to help with this task.

This legislation could greatly aid our small hatcheries which are so vulnerable to nature's whims and financial instability. It could allow commercial fishermen to form cooperatives to establish hatcheries and processing of their own. It could also help the Indian fisheries in their extensive hatchery operations.

A coalition of frightened fishermen are asking you to cut out legislation because of what they fear might happen. We fear it may happen if salmon ranching is not included in H.R. 9370 and if the bill is not then passed and signed into law. Weyerhaeuser and Union Carbide will continue without government aid, the small private hatchery may not weather the adversity without it.

Sincerely,

JON V. JAQUA.

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EUGENE, OREG., *June 21, 1978.*

HON. WARREN G. MAGNUSON,
Senate Committee on, Commerce, Science and Transportation, Russell Senate Office Building, Washington, D.C.

DEAR SENATE MAGNUSON: My name is Karl Manseth and along with my partners I operate Siuslaw Fishies, a sea ranching business located on the central Oregon coast. We were the second sea ranch to be licensed in the state when the laws were changed in 1972.

Our hatchery was construsted and started releasing chum salmon in 1973. Since then we have hatched, reared, and released all the available eggs we could get, which in the last six years has been about 1,200,000.

We started out small and invested all the time and money we could find to build and improve both our facilities and knowledge of the business. We believe that sea ranching offers a way of utilizing the vast resources of the ocean in an economical, non-depleting way to produce the high quality protein which the world needs. However, long before those needs can be met, the egg stocks must be increased to allow large enough releases of fish to achieve good survival rates so that the runs can increase in number.

This year we are constructing and are operating an inland hatchery near Eugene, Oregon. We are using warm, deep well water for the production of millions of accelerated growth coho and chinook salmon for ourselves and for other sea ranchers in Oregon.

This type of expansion is necessary, for the knowledge we gain from these early stages of sea ranching is the foundation that will support the highly productive and beneficial sea ranching industry of the future.

There are about a dozen licensed sea ranches in Oregon, all but a few are small, independent operations struggling to obtain eggs and financing to allow them to expand and increase their runs in a logical, business-like manner.

The trouble we all have is that it is a new and risky business. Because it is new, the insurance companies do not have adequate insurance programs for us. Banks are reluctant because we cannot insure ourselves and there is no track record for them to go by in our industry.

There is no program for increased egg supplies, so it is hard to count on surplus eggs being made available to us. Because eggs are essential to our operating, it is difficult to construct long range business plans with this uncertainty.

In addition, we have the risks which nature provides us each year in the form of flooding and drought.

For these reasons we have been supporting the aquaculture bill H.R. 9370. We believe that our representative leaders finally see the values and problems inherent in this new industry. It is well designed to give a boost to make sea ranching successful for the independents, who are the pioneers of this industry. It would allow us to compete against the large conglomerates, which in the last few years have seen the future of the business and are expending huge amounts of money and could take control of the industry if the independents are not given the support they need.

I understand that there is opposition to the sea ranching portion of the bill by some Indian, sportsmen and commercial fishermen from Washington state, where salmon ranching is not yet legal. In Oregon, where the public has become accustomed to the idea of sea ranching over the years, we have the support of the sportsmen who see more fish to catch. Many fishermen now see the increased supply of salmon as being more advantageous than offsetting effects of any decrease in price that may or may not result. The Commercial Boat Owners Association (All Coast Fisheries) has applied for a sea ranching permit in Oregon because they see it as a better way of harvesting salmon themselves. The Quanalt Indian tribe in southern Washington has been sea ranching for a number of years now.

I personally do not see many conflicts between these parties as to sea ranching, other than someday perhaps a slight reduction in the cost of salmon. But I feel a better supply of protein at a possible lower price to consumers is in all the public's best interest.

I feel that the only real fear that could exist, would be that a few huge companies could gain control of this industry. That is what will happen if the sea ranching part of this bill is eliminated, but the independents can balance that power if they are supported by this bill.

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If I can be of any assistance to you or supply you with any further information I will be glad to do so. I will even come to Washington, D.C. if I could be of any help in informing others of the status and needs of the sea ranching industry.

Yours truly,

KARL MANSETH,
President, Siuslaw Fisheries,
Chairman, Oregon Chum Growers Association.

CHEMICAL-PROOF CORP.,
Woodinville, Wash., July 9, 1978.

SENATE COMMERCE COMMITTEE,
Senate Office Building,
Washington, D.C.

Attention: Mr. Douglas Anderson.
Subject: National Aquaculture Organic Act of 1978.

GENTLEMEN: Regards the above proposed act, we encourage the development of aquaculture and ocean farming of fish under a uniform national program.

Ocean farming will provide a competitive U.S. fish commerce and have a substantital effect on future food resource. A national program will allow equitable opportunity and will increase employment.

Sincerely,

PETER K. SCHOENING.

MERCER ISLAND, WASH., *July 10, 1978.*

Hon. SENATOR WARREN G. MAGNUSEN,
U.S. Senate, Russell Building,
Washington, D.C.
Re: H.R. 9370.

DEAR SENATOR MAGNUSEN: I am involved in trying to start a small private hatchery on the Northern Oregon Coast and am interested in the outcome of H.R. 9370.

I understand that there were hearings on H.R. 9370 in Seattle recently but private salmon ranching interests were not well represented. Most of the discussions centered around concerns that large corporations (i.e., Weyerhaeuser, Union Carbide, etc.) will gain control, dominate policy, and force commercial, recreational and Indian fisheries out of the harvest.

I feel that this could well happen especially if competition in salmon ranching is not encouraged. The large corporations are moving into inland rearing and salt water release-recapture. This release-recapture will be centered in a few coastal areas providing an increase in salmon returns in these locations but no increase in salmon runs in other streams. By encouraging small salmon ranching operations, the salmon runs would be increased on many additional streams thereby enhancing fishing prospects for all concerned.

With these thoughts as background I would like to make the following statement:

"I strongly support the aquaculture bill (H.R. 9370) as written. A Federal aquaculture plan would provide coordinated State and Federal support to maximize fisheries resources and increase fish returns. This bill can only improve the fish runs and harvest for all concerned; commercial, recreational and Indian fisheries. By supporting small private hatcheries, salmon runs will be increased on many coastal tributaries with benefit to all. If this support is not provided, the large corporations with large capital resources will concentrate their release-recapture facilities in only a few tributaries (to maximize returns), thereby increasing runs on only a few coastal tributaries.

The small private hatchery operations are at a critical point in time. We do not have the capital resources to build the facilities that new aquaculture technology dictates. Also, there is no central clearing house to provide the latest technical information or results of aquaculture research. H.R. 9370 is needed to improve fisheries resources, provide competition, increase availability, and reduce the cost of this valuable source of protein to the consumer."

ARNOLD E. MANSETH.

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Ocean Ranching in the State of Washington

This matter has been reviewed by concerned, intelligent, involved individuals looking at all sides of the issue, namely the Presidential Task Force on the Washington State Fisheries. In their report dated January 16, 1978, page 105, they state they have been asked by both sides of the issue to take positions pro and con on aquaculture or sea ranching in the State of Washington. They also state that their regional team believes that neither their charter nor settlement requires them to take a position on their merits, however, they recommend that the enhance sites and the egg requirements for the recent State Enhancement Program and the Federal Program have priority.

Furthermore, new programs on the carrying capacity of the rivers, estuaries, and salt water, as well as their harvesting impact on managing the resource be fully evaluated before additional private ventures are authorized.

My personal observations on ocean ranching in the State of Washington leave me with three main points that I am concerned about and don't feel can be satisfactorily answered at this time. They are:

1. Will the ocean ranching fish be competing with any other species of salmon which are native to the streams and rivers of Washington, Oregon, and California? If so, then by artificially propagating a strain of fish and releasing them to compete with native fish we would be damaging or even killing more strains of native salmon or steelhead.

2. By allowing ocean ranching in the State of Washington, we would be establishing another user group at a time when the rights of user groups are still being assessed and ways of trying to meet their needs are being studied at the present time.

3. The ocean these fish would be feeding in belongs to Society as a whole and should never be used to support "private fish stocks"' at the expense of native stocks.

I would rather see the streams and spawning beds be cleaned up so that natural reproduction could be taking place at its maximum level and that we enhance natural reproduction through the use of spawning channels, hatcheries, or other methods.

With a total enhancement program there will be no room for aquaculture fish in the food chain without direct competition to other runs of fish.

Therefore, in closing, I would ask that you gentlemen do not consider aquaculture and sea ranching in any form at this time.

Respectfully submitted,

Charles W. Hickey, Jr.,
Concerned Citizen and Sport Fisherman.

Washington State Salmon Egg Supply

The following analysis is based on Progress Report No. 30, the 1976 Hatcheries Statistical Report of Production and Plantings by Bob Foster, Vic Fletcher and Bertha Kiser of the Washington Department of Fisheries, July 1977. The analysis is based on data and Tables 2, 3, 4 and 7 of that report.

For the 14 years, 1963–1976, the Department took 965,779 adult Chinook salmon at its hatcheries. Assuming a 50:50 male/female ratio and 5,000 eggs per adult female, this amount of Chinook adults provided 2,414,477,500 salmon eggs. The Department took 1,241,719,727 salmon eggs or 51% of the available salmon eggs over this 14-year period. For the most recent year, 1976, they took 60% of the available Chinook salmon eggs.

For Coho salmon, the total number of adult was 3,259,537. Assuming a 50:50 male/female ratio and 3,000 eggs per female, the total potential number of eggs available was 4,889,305,500. The number of eggs actually taken was 945,600,580 or 19% of the available Coho eggs. For the most recent year, 1976, the number of adults was 226,219 and the percentage taken was 30%

For Chum salmon over the same 14-year period, the number of adults taken was 137,238. Assuming a 50:50 male/female ratio and 3,500 eggs per adult, the total number of eggs available was 240,166,500. The number of Chum eggs actually taken was 140,553,374 or 58 percent of the available. For 1976 the utilization was much higher—97 percent.

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SALMON—THEIR FIGHT FOR SURVIVAL

Pacific salmon have existed for thousands of years. Wild stocks of salmon still exist in many river systems of the Northwest, but the depredations of man are rapidly wiping many stocks of wild salmon from the face of the Earth.

Mans effects on salmon are of two general sorts which are shown in Figure 1. Man's impacts on the physical and biological environment of the freshwater phase has had a very drastic negative impact upon salmon, while at the same time man as a hunter or harvester of salmon in saltwater is having a similar negative impact. Thus, the salmon is subject to a double whammy.

Recently, this double whammy has taken on some technical implications that are creating an impact greater than the wild salmon can bear. Thanks to far-sighted legislation establishing national parks and wild rivers, certain shore-based freshwater environment is now a reasonable refuge for salmon; although, strangely enough, in national parks hunting and carrying of fire arms is prohibited while fishing is encouraged to the extent that state fishing licenses are not required in national parks. This speaks to man's value judgement about the worth of animals. Fury, warm blooded animals—particularly with large brown eyes—are viewed as "good" and are protected; while cold, slimey creatures—such as fish—are not extended similar protection. Even so, the negative depredation of salmon in the freshwater environment is not large in those national parks or along those wild rivers thus the salmon has a sanctuary of sorts and relief from those impacts.

In the saltwater environment, there is no sancutary. Recent technical breakthroughs add another nail to the casket of the salmon. Let me discuss a number of them:

The electronic and space revolutions spurred by the invention of the transistor, consequent miniaturization and consequent gains in electronic reliability help toll a death knell for the wild salmon. Commercial fishermen have hunted salmon for decades, but they are now armed with the latest technical wizardry. Salmon fishing boats are routinely equipped with various electronic devices which enable them to more efficiently capture salmon.

Today, many salmon fishing boats have radar. Radar is useful to salmon fishermen in that it helps them avoid other boats and rocks that could sink them. However, it is also uniquely useful to the gillnetter. Gillnetters fish at night and can use radar to spot the sets of other salmon fishermen that may have preceded them in a drift. The fishermen can then set his gillnet to avoid the pass of an earlier gillnet and thus more efficiently catch salmon. This was not possible before the invention of radar and its miniaturization and reliability increase with transistors.

Another technology that gillnetters have adopted is twisted monofilament nylon. Monofilament gillnet web has been declared illegal because of its extremely high efficiency—the fish cannot see it. Since it was made illegal, fishermen used standard crystal multifilament nylon nets that are much more visible to the fish and thus less efficient. Test results reported by the Washington Sea Grant Marine Advisory Program show that the new twisted monofilament gear was much more efficient during calm water, daylight and twilight conditions. Meanwhile, salmon near extinction don't need more efficiency in gillnets. They don't even need gillnets.

Another electronic technology adopted by fishermen is sonar. Use of sonar in fishing for salmon is illegal; however, it is extremely difficult to police. Side-scan sonar is now available that can look ahead, behind or at any side direction from a boat. Utilized in purse seiners and gillnetters, it allows the fishermen to spot the salmon and to hunt them down with his nets. This sonar is not cheap, it encompasses solid-state, shock-proof circuitry with a cathode ray tube readout.

Another technology adopted by fishermen is Loran-A. Loran-A allows very accurate navigation under a variety of weather conditions. It allows the fishermen to know exactly where he is at. The result of this is trollers, but more often charter boat operators, when they find a school of salmon can radio their brother fishermen providing their exact location and the other fishermen can pull their lines and immediately race over to the spot where the salmon are in order to capture them with hook and line. Navigational aid is also very useful for tenders or pickup boats that pick up fish from the smaller salmon catcher boats. This navigational aid then increases the efficiency of the fishermen, again at the expense of the salmon.

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The communication devices or radios themselves, whether a CB or side-band, also increase the efficiency of fishermen. The invention of the transistor and its availability at a reasonable cost has resulted in their being widely used by fishermen. As described above in the Loran example, fishermen can utilize the radios to notify their brother fishermen of the location of the salmon in order that large packs of hunters can capture more salmon.

Trollers have adopted another electronic device which is called a black box The black box imparts a very slight positive electrical charge to the lure of the salmon troller. This slight positive electrical charge then attracts salmon to the lure and causes them to hit the lure, becoming hooked. The trollers use stainless steel trolling lines and apply a 0.3 to 0.7 volt positive charge to the lure. The utilization of this potential, on the line, is especially useful when fishing is slow. Obviously, when fishing is hot the fisherman is limited by his line handling or fish handling speed and not by the number of fish he actually hooks. The black box is, of course, transistorized and was not practically possible before invention of the transistor. Improvement in the catch rate can be as high as 5 percent utilizing the black box.

The final space age technology that salmon fishermen are utilizing in this increasingly unequal contest is a combination of space satellite, computer communications system, and micro processor. It is almost unbelievable what the salmon must put up with, but it's happening. The National Marine Fishery Service, a division of the National Oceanic & Atmospheric Administration of the Department of Commerce, has satellites orbiting the earth and viewing the ocean. Amongst the data obtained by the satellite is the surface temperature of the ocean. Salmon tend to congregate in ocean water of 51° F; thus by viewing the ocean water through satellite, the areas where these salmon are may be located. Presently, two satellites are utilized, a NOAA five-series and a Tyros series. Temperature is gathered by infrared imagery and reported twice a week. Fishermen receive reports at least biweekly. However, these do not see through clouds very well and thus water temperature locations are not available on cloudy days. However, a new high technology satellite called SeaSat-A will be lauched in June of 1978 by NASA. SeaSat-A will be able to see through clouds by using a microwave radiometer and thus observes and records water temperatures at all times of the day and night. The information will be telemetered from SeaSat-A to an institution in Monterey, California called Navy Fleet Numerical, where a large computer will analyze the data, digest it and then transmit it back to fishermen. The fishermen will be equipped with a device called a Weather Facsimile which will literally draw a map of the ocean surface showing the location of the various temperature bands of water where the salmon are located. The fishermen will then proceed to the proper band in order to begin his fishing. Meanwhile, the wild salmon are being swept off the face of the earth.

The above-described technologies are all in place and are being utilized by salmon fishermen. What is especially ironic is that the Department of Commerce, through the Sea Grant Marine Advisory Program, actively promotes the transfer of these technologies and the implementation of them by fishermen. The Sea Grant Program runs short courses at which fishermen are taught these technologies and how to understand and operate them. Another arm of the same agency also makes low cost loans available to fishermen so they can buy the electronic hardware necessary to implement the technologies. While all of this is going on, the Pacific Fishery's Management Council, an arm of the Department of Commerce, is studying the status of the wild salmon stocks concluding that they are severely depressed, attempting to reduce the impact on the wild salmon and reduce the amount of fishing gear negatively impacting this salmon through buyback. Does it all make any sense?

STATEMENT OF JACKIE PREST, WASHINGTON TROLLERS AUXILIARY, FEDERATION OF INDEPENDENT SEAFOOD HARVESTERS

Mr. CHAIRMAN, committee members, ladies and gentlemen, my name is Jackie Prest and I'm here to speak on behalf of Washington Trollers Auxillary and Federation of Independent Seafood Harvesters. Thank you for this opportunity to bring before you our views of F.C.M.A. I have been involved in the fishing industry for over 25 years. When the foreign fleets first appeared on the West coast off Washington and Oregon in 1966, some of us became totally committed to the protection of our resource and its harvesters. We worked tirelessly and successfully for the 12 mile bill and I was honored to be a member of the first U.S.-U.S.S.R. fishery negotiating team.

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Mildred Malchow, here with me today, and myself were among the first to lay on your desk, Mr. Chairman, petitions for this 200 mile legislation. We were pleased and satisfied when you shepherded it through the Senate. We are even now supportive of the original intent of 94–265, but do not recognize the act as it, is being implemented by the management council. The F.C.M.A. is being used as a tool for allocation, when the intent was support for and enhancement of the domestic resource and its harvest.

Allocation is discrimination, taking from some and giving to others. The oversight is, the Council is taking the power to deprive the domestic harvester of the opportunity to make a living—allocation also seems to mean, taking from those harvesters fishing in the conservation zone and transferring the resource to users out of the management area for purposes of archaic treaties and international trade-offs. The main beneficiary of Council actions at this point is Canada. Many times we have heard it said the troller hasn't had any cuts in seasons and it is past time for management. Absolutely not true. The troller once fished 365 days of the year curtailed only by weather. In the late 1940's a six-month season was imposed. In the late 1950's, we lost March and one half of April. In 1976 the P.F.M.C., in a frenzy to manage, cut April completely and one half of June, one of the most productive months. In 1977 they additionally cut the last six weeks of the season for the Northern coast of Washington State. Cuts? This certainly constitutes cuts, added to the days we lose from weather and other natural phenomena, we find it difficult if not virtually impossible to plan for a continuing, economically viable industry.

My especial concern is the total disregard by the Council for input in the management process by our domestic harvesters. The American fisherman is a professional as well as a small business man and he is concerned with his product from egg stage to market. His goal is to deliver a high quality product for the consumer's table. The management council disregards their concern, holding public hearings on the draft plans, but never incorporating suggestions or comments. At some meetings the Chairman's opening remarks declare his intentions to accept comments from the audience, but when you try to be recognized you get a negative reply. And so it goes ad infinitum. Finally to end this critique, the Council continually schedules its meetings on final plans out of the area of impact. This next FY they will be operating with a healthy budget and yet they ask fishermen to travel great distances with heavy out of pocket expenses to hear of our own demise. An example is review of the final salmon plan in San Diego or Idaho. It is interesting to note they are holding meetings in Denver, Colorado in June on limited entry, again inviting little if any harvester expertise. It is difficult to understand how people with good secure jobs can be the ones to plan limited entry that may deny one of us the right to work at our chosen profession. Many of these participants have never been on a boat and really have no practical knowledge about fishing. How can they make decisions without the necessary professional expertise? It is interesting to note that we were urged to upgrade our fleets 10 years ago, now it is limited entry. By mentioning this particular point I want to emphasize that fishermen are professionals, they do know their industry, they can render good decisions; if they could not they would not continue to come home safely, the hazards are too great. It takes a wealth of knowledge and responsibility to be a successful fisherman. I believe we have the best in the world. It has been market conditions in the past and now we have the additional problem of a biased council to deal with that makes viability difficult.

Again I remind the committee that the original intent of P.L. 94–265 was protection for and enhancement of the resource and its harvesters. American fishermen cannot understand or tolerate foreign participation on our fish stocks on the high seas when P.F.M.C. cuts their season continuously. In 1976 Poland permitted three observers abroad three sterm trawlers for one month. A catch of 4250 salmon in the area off the Columbia River in August and September was their "incidental catch." (Reference Incidence of Salmon in Japanese, Polish, and U.S.S.R. Trawl Catches off California, Oregon, Washington, and Southern British Columbia, 1976, by Robert French. Resource Ecology and Fisheries, Management Division, Northwest and Alaska Fisheries Center, N.M.F.S., N.O.A.A., 2725 Mountlake Boulevard East, Seattle, Washington 98112, August 1977.) Citing figures from the management plan, white section, Page 44, an average incidental catch of 215 salmon per ton times the total hake catch of 200,000 tons equals 43,000 salmon. We know the foreign trawlers have been reduced to 89,000 tons. This is still a highly significant salmon catch. The transfer of salmon from American trollers to Canadians with the 28" size restriction more than makes up the cut to foreign trawlers.

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Our people are concerned for the resource.

The solutions to the manifold problems are simple and basic. You have them readily available in the report to Congress from the Eastland Survey. When people are involved in the planning process from the beginning they are then committed to the course of action they help devise. If we as the harvesters are allowed to participate we will employ sound management principles; it is in our best interests to do so. 50% representation by harvesters is basic to our management concepts and we urge this as a procedural amendment. Our additional recommendations are: only coastal states shall be voting members of the Council. Non-coastal states with a vested interest shall become part of the advisory committee. All language implementing Indian treaties shall be stricken from this act that manages 3–200 miles. All regulations shall be made on the basis of sound biological data, using terms that are operationally defined.

These represent our most pressing concerns with the administration of the law. The concept still has our support, but the way the law has been administered leads us to believe that the intent of Congress is being thwarted.

Thank you for your concern and once again we look to you for resolution of the conflict.

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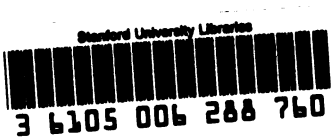

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